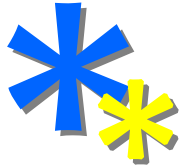




The Best Reliable Partner for High Availability



*2008 상반기 효과적인 시스템 관리를
위한 기술 세미나 - COEX, Seoul, Korea*

Network Installation Manager

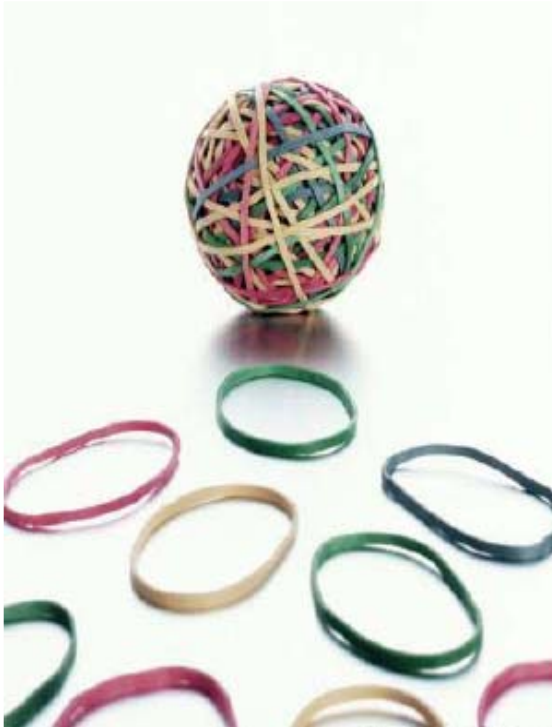
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Senior IT Specialist

MTS, IBM Global Technology Services Korea

April 8, 2008

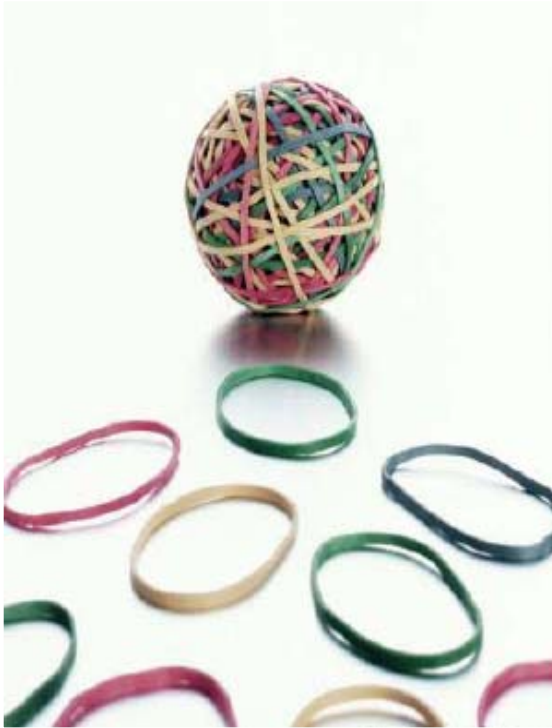


Agenda



1. NIM 개요
2. NIM 개념 및 정의
3. Version별 신규 및 개선 기능
4. EZNIM
5. NIM 시나리오

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NIM 구축 필요성

안정적인 시스템 운영



NIM 구축 필요성 증대

내부 환경

- ◆ 미래지향적 시스템으로의 전환
 - 안정성 최우선으로 고려한 시스템
 - 장애 시 빠른 복구
 - 신기술(Virtualization) 수용

외부 환경

- ◆ 고비용의 시스템 인프라 구조 개선
 - 최적의 System Backup 솔루션
 - 기존 시스템관리 업무 변경 최소화 체계
 - 신기술변화에 능동적인 시스템

정보기술 환경

- ◆ 기술환경 변화에 따른 유연성 있고, 고효율 시스템 구축
 - IT 기술에 대한 유연한 대처
 - 차별적 경쟁력 확보를 위한 새로운 지원 도구 역할을 수행하는 IT 인프라 구현

NIM이란?

- 만약, 다음과 같이 원한다면,
 - CD-ROM이나 Tape없이, AIX를 설치나 upgrade를 원할 때
 - 물리적 H/W의 접근 없이, 원격지에서 S/W를 upgrade하기를 원할 때
 - 수 많은 IBM eServer상의 AIX O/S를 동일하게 유지하고 싶을 때
 - 기 설치된 서버의 이미지를 다른 서버에서 동일하게 설치하고 싶을 때
 - 장애시 미리 백업해 둔 시스템백업(mksysb)를 통해 시스템 복구를 빠르게 하고 싶을 때
 - 시스템 migration시 downtime을 최소화 하고 싶을 때
 - 기존 fileset과 동일한 fileset을 다른 서버에 설치하고 싶을 때
 - 시스템 복구용 시스템백업(mksysb)을 원격지에 분산/보관하고 싶을 때

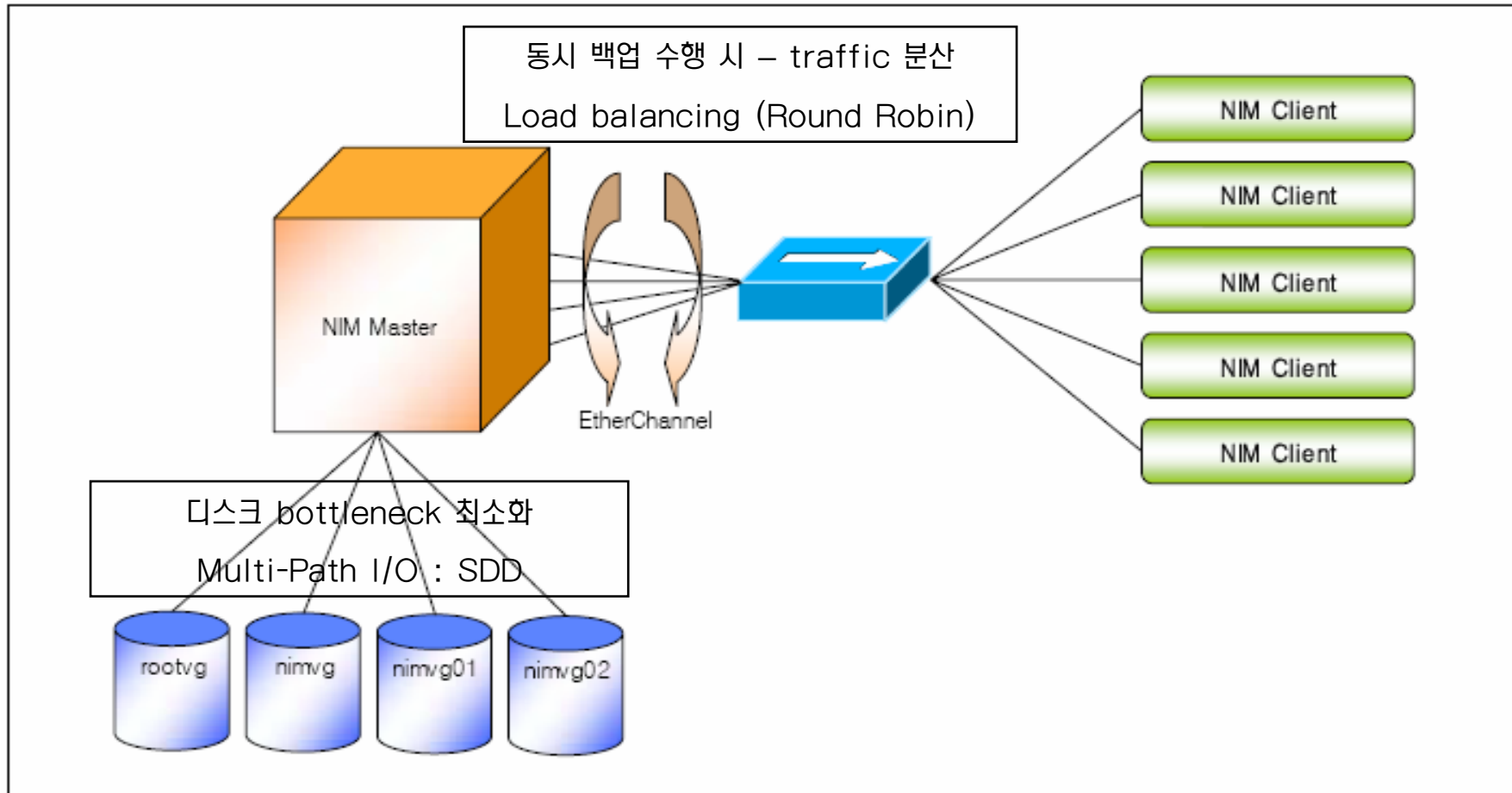


Network Installation Manager

NIM 이란?

- NIM (Network Installation Manager) 이란?
 - Object oriented technology를 사용하는 client/server application
 - Network를 통해 AIX fileset을 설치하고 유지 관리
 - Network(예 : ethernet)을 통해, S/W의 설치나 유지/관리할 수 있는 쉽고 효과적인 방법 제공

NIM 구조



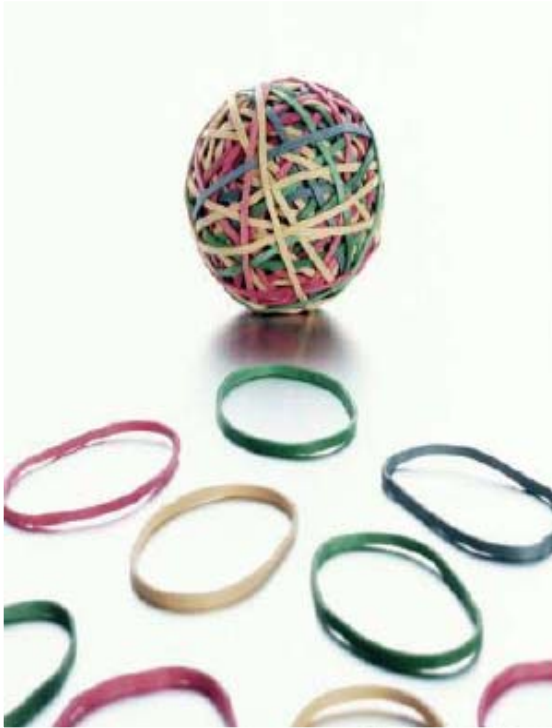
NIM 장점

- AIX CD 내에 포함되어 있는 fileset입니다.
 - bos.sysmgt.nim.master
 - bos.sysmgt.nim.client
- Network를 사용하기 때문에, CD-ROM이나 Tape이 필요 없습니다.
- 동시에 여러 대의 시스템 설치 및 유지/관리 가능합니다.
- 같은 NIM환경하에서, 여러 가지의 AIX version, Technology Level (Maintenance Level)로 저장및 관리가 가능합니다.
- 재해복구 : AIX CD나 시스템 백업(mksysb) tape없이, 시스템 백업(mksysb)을 이용하여 시스템 이미지를 빠르게 복구가 가능합니다.
- Standard Operating environment (SOE) 정의 : 다수의 시스템을 비슷한 환경으로 운영 가능
 - 예 : 같은 LPPs, tools, man pages, file system/logical volume naming 등

NIM 장점

- 시스템에 문제가 발생하여 Maintenance Mode가 필요할 때, 시스템 부팅을 위해서는 CD media의 AIX 레벨이 문제가 발생한 시스템이 가지고 있는 AIX 레벨과 같거나 높은 version이어야 한다.
 - 예 : 처음 설치시 AIX media (CD) 로 AIX 5.3 TL02를 설치하고, 필요에 의해 Internet에서 down 받은 AIX 5.3 TL06으로 upgrade하였다. 시스템 백업(mksysb)을 받아두지 않으면 최신 레벨의 booting image를 가지고 있지 않은 것이다.
 - 이 경우, 시스템 booting을 할 수 없다.
 - NIM master server는 client보다 항상 높은 레벨을 유지하기 때문에, 네트워크 부팅 이미지로 쉽게 복구할 수 있다.
- Cloning system : 하나의 서버에서 다른 서버로 moving
 - 예 : p650 → p595로 OS image backup 재설치시
 - P650 과 p595 시스템의 device driver는 다릅니다. 이 경우에도 NIM master에서 미리 정의되어 있는 device driver를 사용하여 OS image backup이 가능합니다.
- Security 차원에서 nimsh과 ssl을 통해 안전한 data전송
- Aix migration 및 TL upgrade시 가장 빠른 solution 제공
- 중앙 집중화된 mksysb 관리/ 자동화된 mksysb 운영

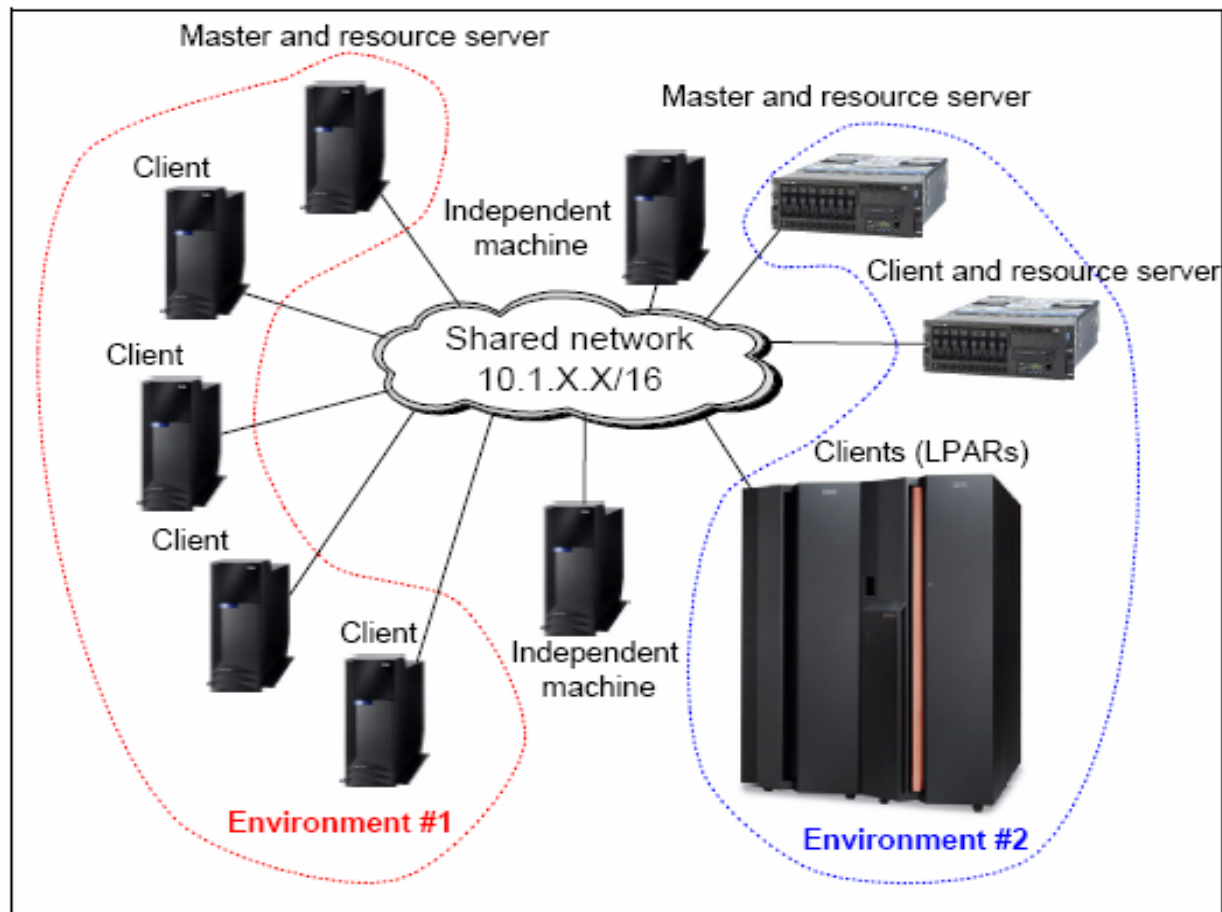
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기본 구성

■ NIM 기본 구성



- Master/Client server, network, disk로 구성됩니다.
- 동일 TCP/IP network
- NIM master server
 - disk 공간 필요
 - network connection
 - Spare CPU cycle
- NIM client
- Resource server

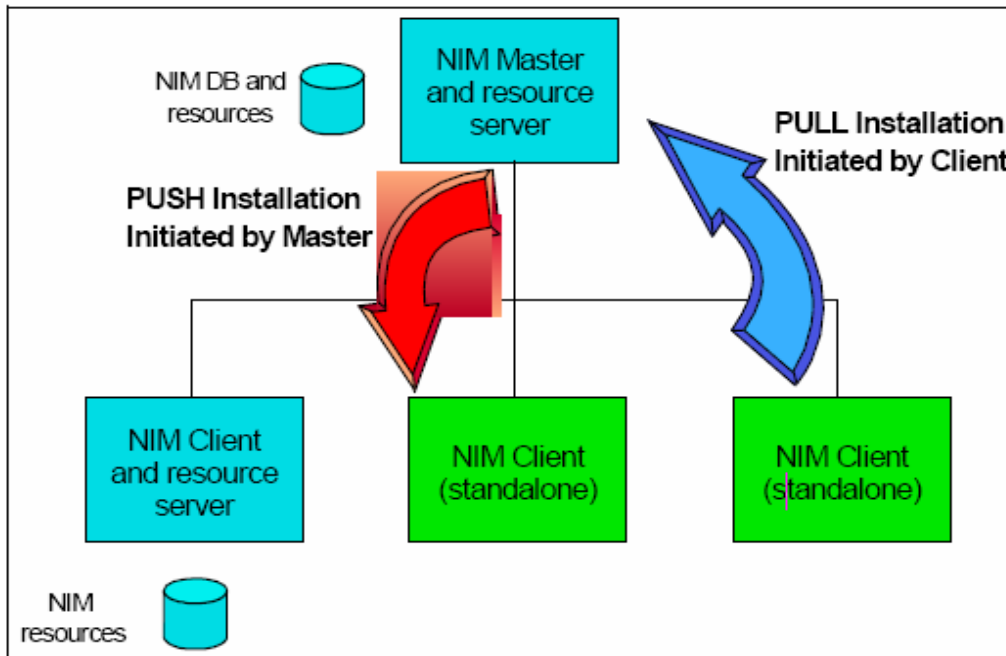
NIM 용어 정의

- Master server
 - NIM 환경을 설정하고, 유지 관리하는 서버
- Client
 - S/W의 설치, update와 같은 NIM master가 수행하는 operation을 위한 target system
- Resource Server
 - Master에 의해 특정한 S/W resource를 가진 서버로 정의된 machine
 - 일반적으로 master = resource
 - Master server의 I/O load가 가중될 때는 분리하는 것이 좋다.

NIM 용어 정의

■ Push and Pull mode

Mode	initiate	필요사항	비 고
Push	Master	Client에 AIX image가 미리 설치되어 있어야 하며, TCP/IP도 구성되어 있어야 한다.	맨 처음 설치 시
Pull	Client	SMS menu가 필요하다. 그러므로, console이나 HMC가 있어야 함	



* System Management Service (SMS)

NIM 용어 정의

■ NIM database

- AIX ODM에 machines, networks, resources, groups라는 class로 저장된다.

Machines	Network	Resources	Groups
master	ent	lpp_source	mac_group
standalone	tok	spot	res_group
diskless	fddi	mksysb	
dataless	atm	bosinst_data	
alternate_master	generic	script	
		image_data	
		installp_bundle	

```
# lsrim
# lsrim -c machines
# lsrim -l <client_name>
# lsrim -c networks
# lsrim -l <network_name>
# lsrim -c resources
# lsrim -l <resource_name>
# lsrim -c groups
```

NIM 용어 정의

■ NIM database (machines class)

```
{nimmast}:/ # lsnim
master          machines      master
boot            resources     boot
nim_script      resources     nim_script
NET_EN1         networks      ent
LPP_53_ML4      resources     lpp_source
SPOT_53_ML4     resources     spot
BID_NP_HDO      resources     bosinst_data
LPAR1           machines      standalone
LPAR2           machines      standalone
LPAR3           machines      standalone
LPAR4           machines      standalone
LPAR5           machines      standalone
LPAR6           machines      standalone
LPAR123456      groups        mac_group
nimgrp          groups        mac_group
spotaix5104     resources     spot
lpp_sourceaix5204 resources     lpp_source
spotaix5204     resources     spot
AllDevicesKernels resources     installp_bundle
```

```
{nimmast}:/ # lsnim -c machines
master          machines      master
LPAR1           machines      standalone
LPAR2           machines      standalone
LPAR3           machines      standalone
LPAR4           machines      standalone
VLPAR3          machines      standalone
VLPAR4          machines      standalone
LPAR4_p5        machines      standalone
vlpar1          machines      alternate_master
VLPAR6          machines      standalone
{nimmast}:/ #
```

NIM 용어 정의

- NIM database (machine class)

```
{nimmast}:/ # lsnim -l LPAR6
LPAR6:
  class           = machines
  type            = standalone
  connect         = shell
  platform        = chrp
  netboot_kernel  = mp
  if1             = NET_EN1 lpar6 0
  cable_type1     = tp
  Cstate          = ready for a NIM operation
  prev_state      = in the process of booting
  Mstate          = not running
  cpuid           = 001A85D24C00
  Cstate_result   = success
  current_master  = nimmast
  sync_required   = yes
{nimmast}:/ #
```

NIM 용어 정의

■ NIM database (Networks class)

- 통신이 가능한 network
- Standard Ethernet, IEEE802.3, Token-Ring, FDDI, ATM 등

```
{nimmast}:/ # lsnim -c networks
NET_EN1      networks      ent
{nimmast}:/ #
```

```
{nimmast}:/ #
{nimmast}:/ # lsnim -l NET_EN1
NET_EN1:
  class      = networks
  type       = ent
  Nstate     = ready for use
  prev_state = information is missing from this object's definition
  net_addr   = 10.1.1.0
  snm       = 255.255.255.0
{nimmast}:/ #
```

NIM 용어 정의

■ NIM database (Resources class)

- Resource Server (master) 상에 있는 file이나 directory를 가리키는 pointer
- bosinst_data : 어떤 수작업의 필요 없이 설치과정을 수행할 수 있는 정보를 담고 있는 file

```
{nimmast}:/ # lsnim -c resources
boot                resources
nim_script          resources
LPP_53_ML4          resources
SPOT_53_ML4         resources
BID_NP_HDO          resources
spotaix5104         resources
lpp_sourceaix5204   resources
spotaix5204         resources
spot5304            resources
lpp_sourceaix5104   resources
lpar1nim-mksysb     resources
exclude_lpar5       resources
MK_LPAR6_AIX530403  resources
MKSYSB_VIO12_53_ML3 resources
MK_AIX5104          resources
mksysb_lpar5c       resources
mksysb_lpar5d       resources
AIXTFLINUX          resources
BID_NP_HDO_MKMIG    resources
nim_move_up_bid     resources
nim_move_up_exclude resources
LPAR4_phys_mksysb   resources
LPAR4_p5_mksysb     resources
{nimmast}:/ #
```

```
{nimmast}:/ # lsnim -l BID_NP_HDO
BID_NP_HDO:
  class      = resources
  type       = bosinst_data
  Rstate     = ready for use
  prev_state = unavailable for use
  location   = /other_res/bid.np.hd0
  alloc_count = 0
  server     = master
{nimmast}:/ #
```

NIM 용어 정의

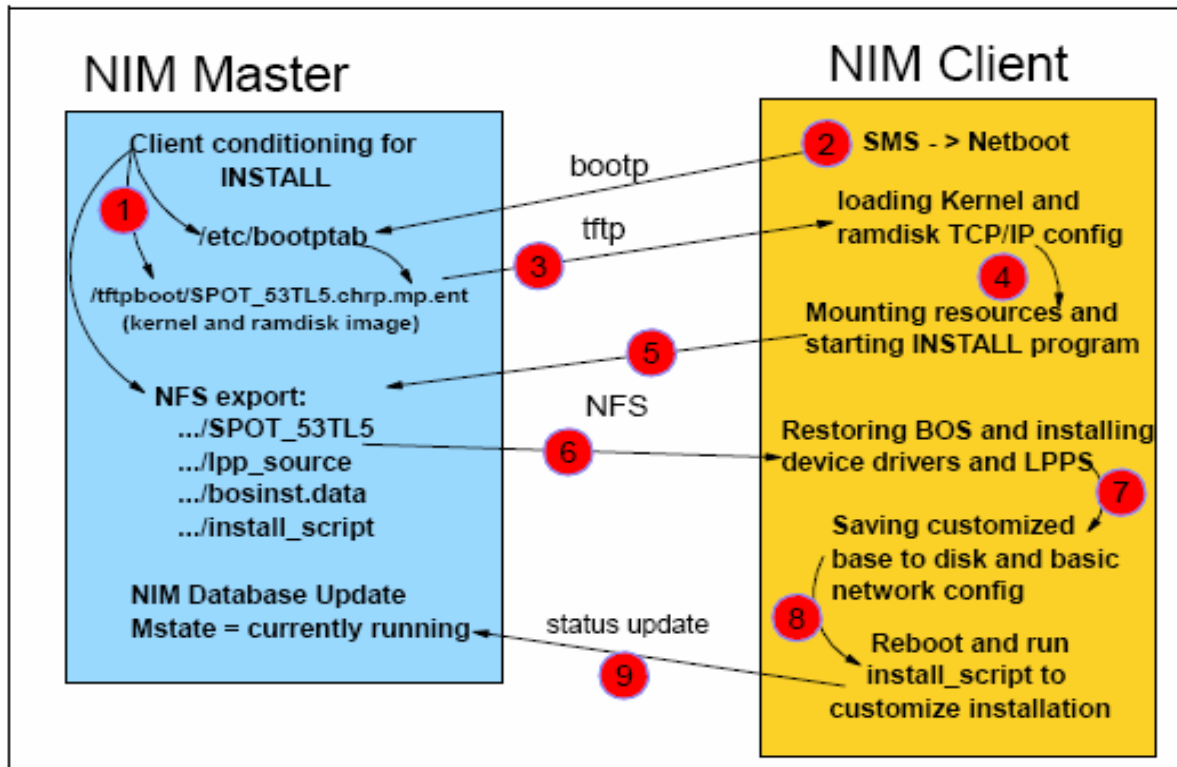
- NIM database (Groups class)
 - Machines와 resources의 집합
 - 두 가지 type가 있다 : mac_group, res_group

```
{nimmast}:/ # lsnim -c groups
LPAR123456      groups      mac_group
nimgrp          groups      mac_group
res_53_m13      groups      res_group
```

NIM 환경 이해

■ 시스템 설치를 위해 필요한 resource

- 꼭 필요한 두 개의 resource : LPP source (lpp_source), Shared Product Object Tree (SPOT)
- 수작업이 필요 없게 하는 resource : bosinst_data, image_data, script

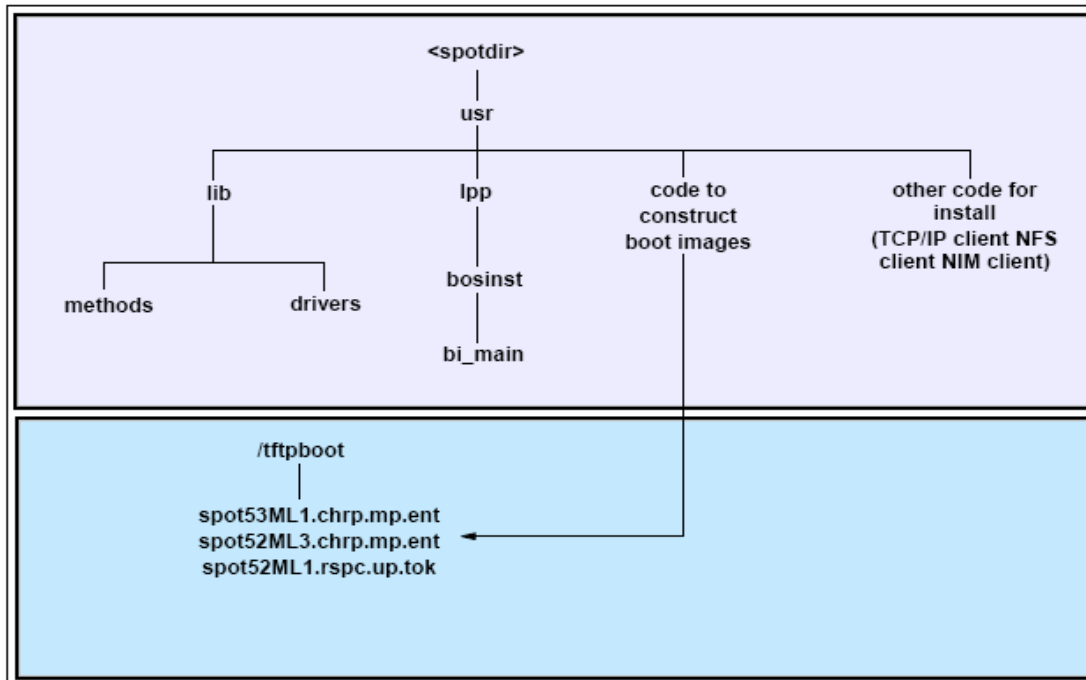


1. NIM master에서의 준비
 - /etc/bootptab
 - NFS export
2. NIM client
 - SMS에서 IP setting → 정상
 - Exit SMS → Netboot
3. Boot information(BOOTP) 참조
 - kernel loading, install programs (TFTP)
- 4, 5, 6. 할당된 SPOT을 NFS mounting후, 설치가 진행된다. (CD 설치와 마찬가지로)
- 7, 8. Configuration이 저장되고, 리부팅후, install_script가 수행됨
9. Status가 Master에 update됨

NIM 환경 이해

■ SPOT (shared Product Object Tree)

- Client가 booting되는 동안 사용되는 code(이미 설치된 fileset)가 존재하는 디렉토리
- AIX의 /usr 내의 code와 동일 (binary objects – executables and libraries, header files and shell scripts)
- CD로 설치할 때 사용되는 기본 ramdisk image의 내용을 대체한다.
- /tftpboot 디렉토리에 저장되는 kernel인 boot image생성에 필요한 코드도 포함하고 있다.



NIM 환경 이해

- SPOT (shared Product Object Tree) – 계속 ...

```

root@GPFS2:/export> lspv | grep nimvg
hdisk43      00ce31ff16fac01b      nimvg      active
hdisk44      00ce315f4fc3d759      nimvg      active
hdisk45      00ce31ff6057db50      nimvg      active
hdisk46      00ce31ff605f843a      nimvg      active
root@GPFS2:/export> lsvg -l nimvg
nimvg:
LV NAME          TYPE        LPs        PPs        PVs  LV STATE      MOUNT POINT
nim_lv           jfs2        500        500        4    open/syncd    /export
loglv01          jfs2log     1          1          1    open/syncd    N/A
root@GPFS2:/export> df /export
Filesystem      512-blocks    Free %Used    lused %lused Mounted on
/dev/nim_lv      65536000    54034456   18%    18538     1% /export
root@GPFS2:/export> cd spot
root@GPFS2:/export/spot> ls
5372_SPOT
root@GPFS2:/export/spot> cd *
root@GPFS2:/export/spot/5372_SPOT> ls
bosinst.data  image.data    lpp_name      usr
root@GPFS2:/export/spot/5372_SPOT> cd usr
root@GPFS2:/export/spot/5372_SPOT/usr> ls
adm          es           lpd           samples      swlag        websm
aix          etc          lpp           sbin         sys
artic960     include     man           share        sysv
bin          lbin        opt           sni          tmp
ccs          lib         perfagent    spool        ucb
dict         lost+found  pub          ssa          usg
root@GPFS2:/export/spot/5372_SPOT/usr> █

```

NIM 환경 이해

■ SPOT (shared Product Object Tree) – 계속...

- NIM database는 여러 개의 class로 구성된다, class 또한 여러 개의 type (spot, lpp_source 등) 으로 구성된다.
- SPOT은 항상 시스템 백업 (mksysb) 의 AIX level과 같거나 높아야 한다.

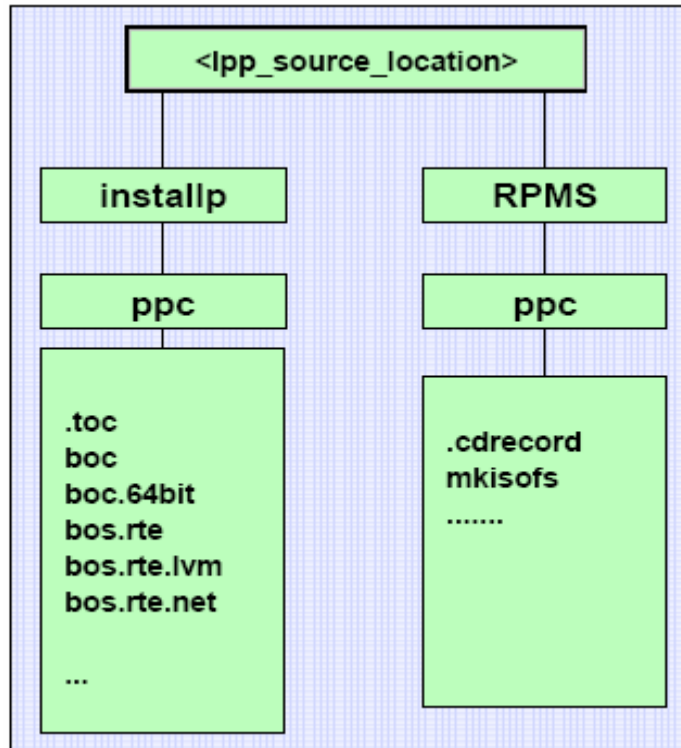
```
{nimmast}:/ #
{nimmast}:/ # lsnim -t spot
SPOT_53_ML4      resources      spot
spotaix5104      resources      spot
spotaix5204      resources      spot
spot5304         resources      spot
{nimmast}:/ #
```

```
{nimmast}:/ #
{nimmast}:/ # lsnim -l SPOT_53_ML4
SPOT_53_ML4:
  class           = resources
  type            = spot
  plat_defined    = chrp
  arch            = power
  bos_license     = yes
  Rstate          = ready for use
  prev_state      = verification is being performed
  location        = /AIX53ML4/SPOT_53_ML4/usr
  version         = 5
  release         = 3
  mod             = 0
  oslevel_r      = 5300-04
  alloc_count     = 1
  server          = master
  if_supported    = chrp.mp ent
  Rstate_result   = success
{nimmast}:/ #
```

NIM 환경 이해

■ lpp_source

- AIX install CD와 유사한 디렉토리
- AIX Licensed Program Products (LPPs) : Backup File Format (bff), RPM package Manager (RPM)로 구성되어 있다.
- Installp 명령어 사용, .toc 사용



.toc – table of contents

```

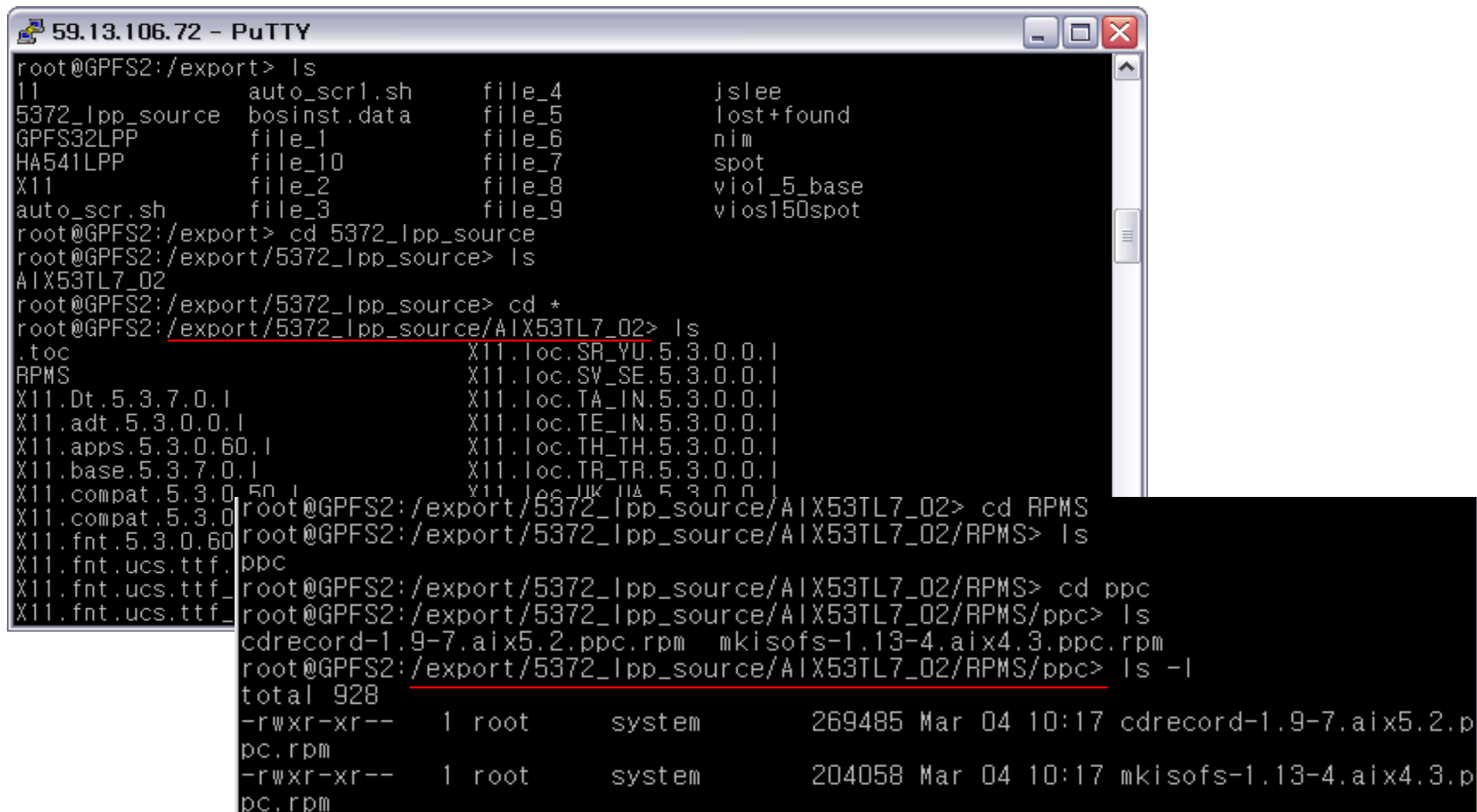
{nimast}:/ #
{nimast}:/ # lsrim -t lpp_source
LPP_53_ML4      resources      lpp_source
lpp_sourceaix5204  resources      lpp_source
lpp_sourceaix5104  resources      lpp_source
AIXTFLINUX      resources      lpp_source
{nimast}:/ #
  
```

```

{nimast}:/ # lsrim -l LPP_53_ML4
LPP_53_ML4:
  class      = resources
  type       = lpp_source
  arch       = power
  Rstate     = ready for use
  prev_state = ready for use
  location   = /AIX53ML4/LPP_53_ML4
  simages    = yes
  alloc_count = 1
  server     = master
{nimast}:/ #
  
```

NIM 환경 이해

■ lpp_source – 계속 ...



```

59.13.106.72 - PuTTY
root@GPFS2:/export> ls
11                auto_scr1.sh      file_4            jslee
5372_lpp_source   bosinst.data      file_5            lost+found
GPFS32LPP         file_1            file_6            nim
HA541LPP          file_10           file_7            spot
X11               file_2            file_8            vio1_5_base
auto_scr.sh       file_3            file_9            vios150spot
root@GPFS2:/export> cd 5372_lpp_source
root@GPFS2:/export/5372_lpp_source> ls
AIX53TL7_02
root@GPFS2:/export/5372_lpp_source> cd *
root@GPFS2:/export/5372_lpp_source/AIX53TL7_02> ls
.toc                X11.loc.SR_YU.5.3.0.0.1
RPMS                 X11.loc.SV_SE.5.3.0.0.1
X11.Dt.5.3.7.0.1    X11.loc.TA_IN.5.3.0.0.1
X11.adt.5.3.0.0.1    X11.loc.TE_IN.5.3.0.0.1
X11.apps.5.3.0.60.1 X11.loc.TH_TH.5.3.0.0.1
X11.base.5.3.7.0.1  X11.loc.TR_TR.5.3.0.0.1
X11.compat.5.3.0.5n1 X11.loc.UK_IL.5.3.0.0.1
X11.compat.5.3.0.5n1
X11.fnt.5.3.0.60.1
X11.fnt.ucs.ttf      ppc
X11.fnt.ucs.ttf      root@GPFS2:/export/5372_lpp_source/AIX53TL7_02/RPMS> cd ppc
X11.fnt.ucs.ttf      root@GPFS2:/export/5372_lpp_source/AIX53TL7_02/RPMS/ppc> ls
cdrecord-1.9-7.aix5.2.ppc.rpm  mkisofs-1.13-4.aix4.3.ppc.rpm
root@GPFS2:/export/5372_lpp_source/AIX53TL7_02/RPMS/ppc> ls -l
total 928
-rwxr-xr--  1 root    system      269485 Mar 04 10:17 cdrecord-1.9-7.aix5.2.ppc.rpm
-rwxr-xr--  1 root    system      204058 Mar 04 10:17 mkisofs-1.13-4.aix4.3.ppc.rpm

```

NIM 환경 이해

■ 시스템 백업 (mksysb)

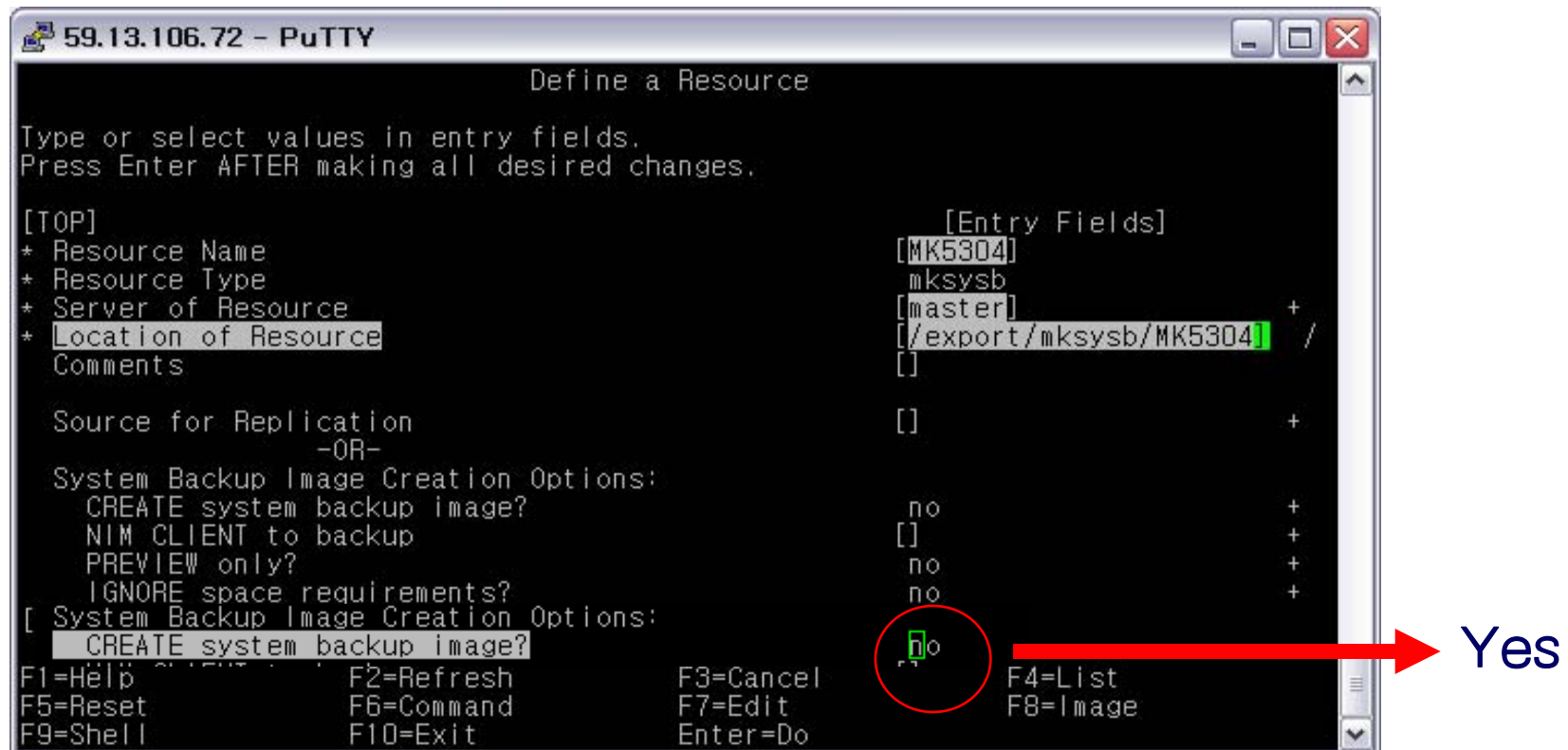
- 어떤 시스템의 루트 볼륨 그룹 (rootvg) 의 이미지를 가지고 있는 파일
- Restore와 Install에 사용
- smit mksysb로 image 생성 (일반적인 AIX에서 수행)



NIM 환경 이해

■ 시스템 백업 (mksysb) – 계속 ...

- smit nim_mkres에서 mksysb 선택 후, CREATE system backup image의 “no”를 “Yes”로 변경
- smit nim → Perform NIM Administration Tasks → Manage Resources
→ Define a Resource mksysb = a mksysb image 선택

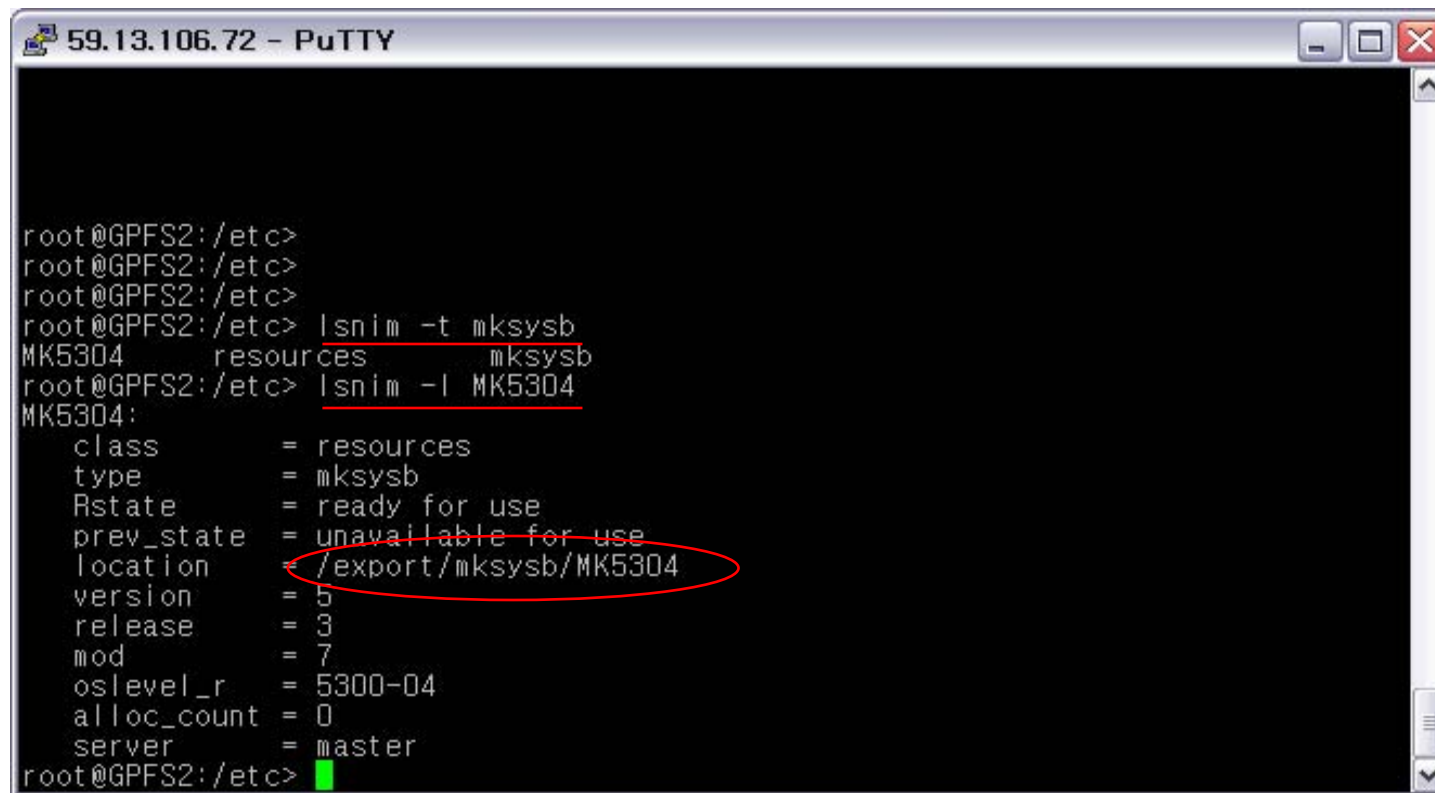


NIM 환경 이해

■ 시스템 백업 (mksysb) – 계속 ...

– 또는 다음의 명령 사용

```
# nim -o define -t mksysb -a source=<client_to_backup> -a server=master -a location=<location  
to store file> RESOURCE_NAME
```



The screenshot shows a PuTTY terminal window titled "59.13.106.72 - PuTTY". The terminal displays the following commands and output:

```
root@GPFS2:/etc>  
root@GPFS2:/etc>  
root@GPFS2:/etc>  
root@GPFS2:/etc> lsnim -t mksysb  
MK5304      resources      mksysb  
root@GPFS2:/etc> lsnim -l MK5304  
MK5304:  
  class      = resources  
  type       = mksysb  
  Rstate     = ready for use  
  prev_state = unavailable for use  
  location   = /export/mksysb/MK5304  
  version    = 5  
  release    = 3  
  mod        = 7  
  oslevel_r  = 5300-04  
  alloc_count = 0  
  server     = master  
root@GPFS2:/etc>
```

The output shows the details of the NIM resource MK5304, which is a mksysb resource. The location is highlighted with a red circle.

NIM 환경 이해

■ bosinst_data

- 일반 ASCII file : 테이프나 CD/DVD 로 부터 시스템 백업 이미지를 저장하기 위해 사용하는 bosinst.data 와 유사함.
- 일반적으로, AIX 설치 시 콘솔, 언어, 설치 방법, rootvg를 위한 target disk의 선택이 필요하다. 그러나, bostinst_data resource는 어떤 수작업 없이 자동적으로 설치를 진행할 수 있다.
- smit mksysb로 image 생성 (/bosinst.data 와 /image.data 가 생성된다)
- 생성된 /bosinst.data 파일을 원하는 디렉토리로 복사한 후,

```
root@GPFS2:/> ls -l *.data
-rw-r--r-- 1 root    system      5714 Mar 25 10:31 bosinst.data
-rw-r--r-- 1 root    system     9879 Mar 25 10:31 image.data
```

```
{nimmast}:/ # ls|nim -t bosinst data
BID_NP_HDO          resources      bosinst_data
BID_NP_HDO_MKMIG    resources      bosinst_data
nim_move_up_bid      resources      bosinst_data
{nimmast}:/ #
```

```
{nimmast}:/ # ls|nim -l BID_NP_HDO
BID_NP_HDO:
  class      = resources
  type       = bosinst_data
  Rstate     = ready for use
  prev_state = unavailable for use
  location   = /other_res/bid.np.hdo
  alloc_count = 0
  server     = master
{nimmast}:/ #
```

NIM 환경 이해

■ bosinst_data (계속..)

- bosinst.data 파일 내용 수정 → 수작업이 필요 없게, 아래의 붉은 글씨의 parameter 수정이 꼭 필요하다.

control_flow:

CONSOLE = /dev/lft0
INSTALL_METHOD = overwrite
PROMPT = no

EXISTING_SYSTEM_OVERWRITE = yes
 INSTALL_X_IF_ADAPTER = yes
 RUN_STARTUP = yes
 RM_INST_ROOTS = no
 ERROR_EXIT =
 CUSTOMIZATION_FILE =
 TCB = no
 INSTALL_TYPE =
 BUNDLES =
 SWITCH_TO_PRODUCT_TAPE =
 RECOVER_DEVICES = Default
 BOSINST_DEBUG = no

ACCEPT_LICENSES = yes

DESKTOP = NONE
 INSTALL_DEVICES_AND_UPDATES = yes
 IMPORT_USER_VGS =
 ENABLE_64BIT_KERNEL = yes
 CREATE_JFS2_FS = yes
 ALL_DEVICES_KERNELS = yes
 GRAPHICS_BUNDLE = yes
 MOZILLA_BUNDLE = no
 KERBEROS_5_BUNDLE = no
 SERVER_BUNDLE = no
 ALT_DISK_INSTALL_BUNDLE = no
 REMOVE_JAVA_118 = no
 HARDWARE_DUMP = yes

ADD_CDE = no
 ADD_GNOME = no
 ADD_KDE = no
 ERASE_ITERATIONS = 0
 ERASE_PATTERNS =
 MKSYSB_MIGRATION_DEVICE =

locale:

BOSINST_LANG = en_US
CULTURAL_CONVENTION = en_US
MESSAGES = en_US
KEYBOARD = en_US

target_disk_data:

PVID =
 PHYSICAL_LOCATION =
 CONNECTION =
 LOCATION =
 SIZE MB =

HDISKNAME = hdisk0

/bosinst.data 원래 내용

control_flow:
 CONSOLE = Default
 INSTALL_METHOD = overwrite
 PROMPT = yes

ACCEPT_LICENSES =

locale:
 BOSINST_LANG = en_US
 CULTURAL_CONVENTION = en_US
 MESSAGES = en_US
 KEYBOARD = en_US

SIZE_MB = 10000
 HDISKNAME = hdisk2

NIM 환경 이해

■ Script

- 일반 File
- Client상에 Base Operating System 설치가 끝난 후, customization이 필요할 수 있다.
(예) file system 크기 조절, 추가적인 사용자 생성 등
- Customization을 수행하기 위해 필요한 쉘 명령어를 담고 있는 file임.

```
#!/bin/ksh
# node_cust
# Synopsis.....%M%
# Author.....User01
# Created.....2006
# Version.....%Z% %M% %I% (%E% %U%) %Q%
# Description....N/A
# Input.....N/A
# Output.....Perform Node Customization.
# Algorithm.....N/A
#-----
#
# Redirect STDOUT and STDERR to a logfile
#
exec 1>/tmp/${0##*/}.log
exec 2>&1
#
# Acquiring the /etc/motd file from the NIM master...
#
if [[ "$NIM_SHELL" = "shell" ]];then
    if [[ "$NIM_MASTER_HOSTNAME" != "" ]];then
        ping -c 1 -w 1 $NIM_MASTER_HOSTNAME >/dev/null 2>&1
        if [[ $? -eq 0 ]];then
```

NIM 환경 동작 전 고려사항

■ 기본 요소

- AIX 와 네트워크

■ AIX 관련 고려사항

- 신규 lpp_source, mksysb를 생성 하기 위한 filesystem 공간 ➔ full이 아니어야 한다.
- File System이 JFS인 경우에는 File limit가 2GB로 설정되어 있다. ➔ unlimited로 변경(ulimit -a)
- 올바른 permission
- lpp_source의 table인 .toc file은 항상 최신으로 update 되어 있어야 한다.

■ Network 관련 이슈

- 물리적으로 네트워크 연결 상태가 정상적이어야 한다.
- NIM에 사용하는 adapter의 speed나 duplex가 제대로 설정되어 있어야 한다.
- Name resolution이 제대로 동작해야 한다. (/etc/hosts)

NIM master 선택

- NIM master의 선택은 가장 중요한 단계이다.
- Criteria
 - AIX가 설치되어 있어야 한다.
 - 항상 client의 AIX 레벨과 같거나 높은 레벨을 가지고 있어야 한다.
 - Production Workload machine은 피한다.
 - AIX upgrade를 위해 정기적으로 shutdown이 필요하다.
 - 업무에 영향을 초래할 수 있다.
 - CPU 사이클을 많이 사용하지 않는다.
 - Micro-partition을 사용해도 좋다.
 - 그러나, 별도의 시스템을 선택하라.
 - Network를 고려하라.
 - 별도의 adapter로 구성하거나, 사용량이 적은 network를 선택하라.
 - Etherchannel 구성도 고려
 - Security를 위해 nimsh을 이용할 것인지,SSL을 할 것인지 고려
 - nimsh와 ssl 통신을 사용

NIM master 선택

■ Criteria (계속...)

- 디스크 공간을 고려하라.
 - 공식적으로 권고하는 디스크 공간은 없다.
 - 아래의 권고하는 크기를 참고

Item	Recommended size	Location	Comments
lpp_source	3 GB per AIX version or TL	Set by the administrator	The size of an lpp_source for base install is less than 1 GB per AIX version or TL. It will be more if there are optional lpp_source filesets.
spot	1 GB per AIX version or TL	Set by the administrator	N/A
mksysb	4 GB	Set by the administrator	This figure is an average. Generally, the size can be between 1 GB (for a basic rte install) to 6GB or 7 GB for a running machine.
other	1GB	Set by the administrator	Used to put other resources, such as bosins_data, scripts and so on. The size of the basic space is negligible.

- 만약, 다음과 같이 계획한다면..
- AIX 5.2, 5.3의 2개 release
- 각각 3개의 ML
- 10개의 mksysb (client가 10개)
- 각각 3개의 mksysb version



$$3*6 + 1*6 + 4*10*3 + 1 = 145\text{GB}$$

NIM 구성 시작 단계

- Master system 선택
- NIM master에 AIX 설치
 - 가장 최신 버전의 AIX 설치 (항상 최신 레벨을 유지한다)
- 다음의 요구사항을 점검한다.
 - AIX 레벨 점검
 - `oslevel -r` 또는 `oslevel -s`
 - 디스크 공간 점검
 - `lspv, lsattr -El hdisk*`
 - 네트워크 어댑터 점검
 - `lscfg, netstat -in`

NIM 구성 시작 단계

- NIM master에 fileset 설치하기
 - bos.sysmgt.nim.master
 - bos.sysmgt.nim.spot
 - smit install_latest

```

Install Software
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* INPUT device / directory for software      /dev/cd0
* SOFTWARE to install                        [@ 5.3.0.40
PREVIEW only? (install operation will NOT occur) no +
COMMIT software updates?                       yes +
SAVE replaced files?                           no +
AUTOMATICALLY install requisite software?      yes +
EXTEND file systems if space needed?            yes +
OVERWRITE same or newer versions?              no +
VERIFY install and check file sizes?           no +
Include corresponding LANGUAGE filesets?       yes +
DETAILED output?                               no +
Process multiple volumes?                      yes +
ACCEPT new license agreements?                 no +
Preview new LICENSE agreements?                no +

F1=Help      F2=Refresh      F3=Cancel      F4=List
F5=Reset     F6=Command     F7=Edit       F8=Image
F9=Shell     F10=Exit       Enter=Do

```

위의 fileset을 선택

NIM 구성 시작 단계

- NIM master 구성
 - smit nimconfig 또는, smit eznim
 - Network 구성

Configure Network Installation Manager Master Fileset

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
* Network Name	[NET_EN0]	
* Primary Network Install Interface	[en0]	+
Allow Machines to Register Themselves as Clients?	[yes]	+
Alternate Port Numbers for Network Communications (reserved values will be used if left blank)		
Client Registration	☐	+
Client Communications	☐	+

F1=Help
F5=Reset
F9=Shell

F2=Refresh
F6=Command
F10=Exit

F3=Cancel
F7=Edit
Enter=Do

F4=List
F8=Image

NIM 구성 시작 단계

- NIM master에서 사용하는 파일시스템 생성하기
 - lpp_source, SPOT resource 가 들어 갈 파일 시스템 생성
- 기본 resource 정의하기
 - lpp_source 생성
 - smitty nim → Configure the NIM Environment
 - configure a Basic NIM Environment (Easy Startup)

Define a Resource

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

* Resource Name

[LPP_53_ML4]

* Resource Type

lpp_source

* Server of Resource

[master]

+

* Location of Resource

[/nim/aix53ml4/lppsour> /

Architecture of Resource

[]

+

Source of Install Images

[cd0]

+ /

Names of Option Packages

[]

Show Progress

[yes]

+

Comments

[]

F1=Help

F2=Refresh

F3=Cancel

F4=List

F5=Reset

F6=Command

F7=Edit

F8=Image

NIM 구성 시작 단계

■ 기본 resource 정의하기 (계속...)

— SPOT 생성

smitty nim → Configure the NIM Environment

→ configure a Basic NIM Environment (Easy Startup)

Define a Resource

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
* Resource Name	[SPOT 53 ML4]	
* Resource Type	spot	
* Server of Resource	[master]	+
* Source of Install Images	[LPP_53_ML4]	+
* Location of Resource	[/nim/aix53ml4/]	/
Expand file systems if space needed?	yes	+
Comments	[]	
installp Flags		
COMMIT software updates?	no	+
SAVE replaced files?	yes	+
AUTOMATICALLY install requisite software?	yes	+
OVERWRITE same or newer versions?	no	+

NIM 구성 시작 단계

■ Client 정의

- hostname은 resolvable IP label이어야 한다. (/etc/hosts에 등록)
- `smit nim_mkmac`

```

Define a Machine

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[TOP]                                [Entry Fields]
* NIM Machine Name                    [LPAR3]
* Machine Type                        [standalone]          +
* Hardware Platform Type              [chrp]                  +
Kernel to use for Network Boot        [mp]                    +
Communication Protocol used by client  []                      +
Primary Network Install Interface
* Cable Type                          tp                        +
Network Speed Setting                  []                      +
Network Duplex Setting                 []                      +
* NIM Network                         NET_EN1
* Host Name                           lpar3
Network Adapter Hardware Address       [0]
Network Adapter Logical Device Name    []
[MORE...4]

F1=Help      F2=Refresh    F3=Cancel    F4=List
F5=Reset     F6=Command    F7=Edit     F8=Image
F9=Shell     F10=Exit      Enter=Do
  
```

NIM 구성 시작 단계

■ Client 설치 시작

- smit nim_task_inst
 - ➔ Install the Base Operating System On Standalone Clients
- Initiate reboot and installation now

yes ➔ no로 변경

이유 : client network boot 을
수동적으로 initiate해야 함

Install the Base Operating System on Standalone Clients			
Type or select values in entry fields. Press Enter AFTER making all desired changes.			
[TOP]	[Entry Fields]		
* Installation Target	LPAR3		
* Installation TYPE	rte		
* SPOT			
SPOT_53_ML4			
LPP_SOURCE	[LPP_53_ML4]	+	
MKSYSE			
BOSINST_DATA to use during installation	☐	+	
IMAGE_DATA to use during installation	☐	+	
RESOLV_CONF to use for network configuration	☐	+	
Customization SCRIPT to run after installation	☐	+	
Customization FB Script to run at first reboot	☐	+	
ACCEPT new license agreements?	[yes]	+	
Remain NIM client after install?	[yes]	+	
PRESERVE NIM definitions for resources on this target?	[yes]	+	
FORCE PUSH the installation?	[no]	+	
Initiate reboot and installation now?	[no]	+	
-OR-			
Set bootlist for installation at the next reboot?	[no]	+	
[MORE...22]			
F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6=Command	F7>Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

NIM 구성 시작 단계

■ 추가적인 점검

- Master와 client가 정상적으로 set up된 후, 다음의 세가지를 점검해야 한다.
- /etc/bootptab

```
{nimmast}:/ # tail /etc/bootptab
.....
#      T179 -- (xstation only) -- XDMCP host
#      T180 -- (xstation only) -- enable virtual screen
lpar3:bf=/tftpboot/lpar3:ip=10.1.1.13:ht=ethernet:sa=10.1.1.1:sm=255.255.255.0:
{nimmast}:/ #
```

- bf : boot file
- ip : host IP address
- ht : hardware type
- sa : server IP address
- sm : subnet mask

- /tftpboot 디렉토리 내에 생성된 boot file 점검

```
{nimmast}:/ # ls -l /tftpboot
total 151248
-rw-r--r--  1 root    system    12211712 Jun 20 15:57
AIX53_ML04_debug.chrp.mp.ent
-rw-r--r--  1 root    system    11688960 Jun 12 11:13 SPOT-VIO.chrp.mp.ent
-rw-r--r--  1 root    system    12211712 Jun 19 16:24
SPOT_53_ML4.chrp.mp.ent
-rw-r--r--  1 root    system    12211712 Jun 22 17:43
SPOT_PRUEBA.chrp.mp.ent
-rw-r--r--  1 root    system    12211712 Jun 22 18:01 SPOT_TEST.chrp.mp.ent
lrwxrwxrwx  1 root    system      33 Jun 26 09:11 lpar3 ->
/tftpboot/SPOT_53_ML4.chrp.mp.ent
-rw-r--r--  1 root    system     1109 Jun 26 09:11 lpar3.info
-rw-r--r--  1 root    system    8162755 Jun 02 10:37
spotaix5104.chrp.mp.ent
-rw-r--r--  1 root    system     8720910 Jun 02 11:49
spotaix5204.chrp.mp.ent
{nimmast}:/ #
```

- SPOT 으로 부터 생성된 boot image (kernel) 의 symbolic link
- lpar3.info : boot image file과 install script가 사용하는 환경변수가 있다.

NIM 구성 시작 단계

■ 추가적인 점검 (계속...)

- 필수 resource가 client에 할당이 되었는 지, 그것의 Cstate parameter가 제대로 인지 확인

```
{nimmast}:/ # lsrim -l LPAR3
LPAR3:
  class          = machines
  type           = standalone
  connect        = shell
  platform       = chrp
  netboot kernel = mn
  if1            = NET_EN1 lpar3 0
  cable_type1    = tp
  Cstate         = BOS installation has been enabled
  prev_state     = ready for a NIM operation
  Mstate         = not running
  boot          = boot
  lpp_source      = LPP_53_ML4
  nim_script     = nim_script
  spot           = SPOT_53_ML4
  cpuid         = 001A85D24C00
  control        = master
  current_master = nimmast
  sync_required  = yes
{nimmast}:/ #
```

NIM 구성 시작 단계

- Client 설치를 위한 SMS menu 시작
 - Client : power on
 - SMS menu
 - Console 사용하여, “1” key 를 누름 (E1F1에서..)

- 추가적인 점검 다시 수행
 - /etc/bootptab file
 - /tftpboot file
 - Cstate : Ready for a NIM operation

NIM 유지/관리

■ Client에 신규 Fileset, PTF (fix), TL을 update하기

- Client상에 빠져있는 fileset 확인
- OS level 확인
- 필요한 fileset이 lpp_source에 있는 지 확인

smit nim → Perform NIM Administrative Tasks → Manage Resources

```

Manage Resources

Move cursor to desired item and press Enter.

List All Network Install Resources
Define a Resource
Change/Show Characteristics of a Resource
Show the Contents of a Resource
Remove a Resource
+-----+
|               Network Install Operation to Perform               |
|                                                                    |
| Move cursor to desired item and press Enter.                     |
| showres = show contents of a resource                             |
| lslpp  = list LPP information about an object                     |
| check  = check the status of a NIM object                         |
| lppmgr  = eliminate unnecessary software images in an lpp_source  |
| update  = add or remove software to or from an lpp_source        |
|                                                                    |
| F1=Help      F2=Refresh      F3=Cancel                           |
| F8=Image     F10=Exit        Enter=Do                            |
| F1 / =Find   n=Find Next                                          |
+-----+
F9+

```

NIM 유지/관리

■ Client에 신규 Fileset, PTF (fix), TL을 update하기 (계속...)

— 필요한 fileset 을 lpp_source 에 추가

smit nim → Perform NIM Software Installation and Maintenance Tasks →
 Software Maintenance and Utilities → Add Software to an lpp_source →
 Select Target lpp_source → Select Software Source

Add Software to an lpp_source

Type or select values in entry fields.
 Press Enter AFTER making all desired changes.

TARGET lpp_source SOURCE of Software to Add SOFTWARE Packages to Add -OR- INSTALLP BUNDLE containing packages to add gencopy Flags DIRECTORY for temporary storage during copying EXTEND filesystems if space needed? Process multiple volumes?	[Entry Fields] LPP_53_ML4 cd0 ☐ + ☐ + ☐ + ☐ + ☐ + ☐ +
---	---

F1=Help
F5=Reset

F2=Refresh
F6=Command
F9=Shell

F3=Cancel
F7=Edit
F10=Exit

F4=List
F8=Image
Enter=Do

NIM 유지/관리

- Client에 신규 Fileset, PTF (fix), TL을 update하기 (계속...)
 - Master에서 Client로 push operation 수행
 - # smit nim_task_inst
 - ➔ Install Software

Install and Update Software

Move cursor to desired item and press Enter.

```
Install the Base Operating System on Standalone Clients
Install Software
Update Installed Software to Latest Level (Update All)
Install Software Bundle
Update Software by Fix (APAR)
Install and Update from ALL Available Software
```

F1=Help
F9=Shell

F2=Refresh
F10=Exit

F3=Cancel
Enter=Do

F8=Image

NIM 유지/관리

■ Client에 신규 Fileset, PTF (fix), TL을 update하기 (계속...)

— 설치 결과 점검

```
# smit nim_list_installed_sw
```

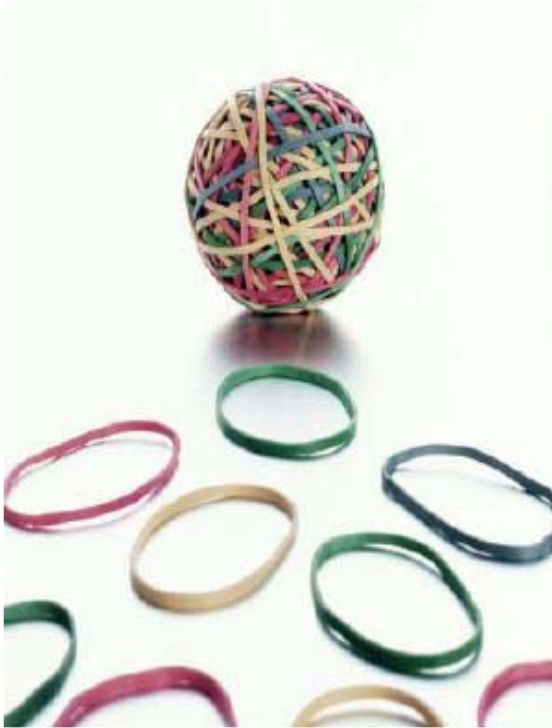
List Installed Software

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

		[Entry Fields]	
*	Target	LPAR3	
*	Software Names	[all]	+
	Show SUPERSEDED levels?	[yes]	+

F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6=Command	F7=Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

Agenda



1. NIM 개요
2. NIM 개념 및 정의
3. Version별 신규 및 개선 기능
4. EZNIM
5. NIM 시나리오

AIX V5.1

- RPMS fileset 설치 가능
 - 기존의 installp를 대체
 - geninstall, gencopy 사용 가능
 - RPM package 관리가 용이

AIX V5.2

■ lpp_source 관리 툴이 개선됨

- 시스템 백업 (mksysb)를 설치할 위해, 이전 버전에서는 lpp_source를 요구함.
- 존재하는 lpp_source에 패키지 추가, 삭제가 가능
- lppmgr 가능
 - 불필요한 fileset을 lpp_source에서 제거 가능
 - 예 : 필요 없는 Language fileset
 - smit nim

Perform NIM Software Installation and Maintenance Tasks

→ Software Maintenance and Utilities → Eliminate Unnecessary Software Image in an lpp_source → Select Target lpp_source

Eliminate Unnecessary Software Images in an lpp_source

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
TARGET lpp_source	LPP_53_ML4	
PREVIEW only?	yes	+
REMOVE DUPLICATE software	yes	+
REMOVE SUPERSEDED updates	yes	+
REMOVE LANGUAGE software	yes	+
PRESERVE language	[en_US]	
REMOVE NON-SIMAGES software	no	+
SAVE removed files	no	+
DIRECTORY for storing saved files	[]	
EXTEND filesystems if space needed?	yes	+

AIX V5.2

■ 동시에 여러 개의 resources 생성 가능

- 동일 서버에서 서로 다른 File System에 여러 개의 lpp_source와 mksysb 동시에 생성 가능
 - SPOT은 동시에 생성 불가능 : installp 프로세스를 요구하기 때문
 - 하나의 SPOT, lpp_source, mksysb는 생성 가능

■ Alternate disk migration installation

- Free disk에 rootvg 복제 본 생성
- 새로운 release level로 NIM을 통해 migrate한다.
- 장점
 - Downtime 감소
 - Migration 실패 시 빠른 복구
 - 높은 flexibility와 customization
 - 쉬운 configuration utilities

AIX V5.2

■ EZNIM

- 일반적인 구성일 시, 쉽게 사용할 수 있다
- smit eznim

■ “nim_master_setup” 명령어

- 파일 셀 : bos.sysmgt.nim.master
- NIM master 구성하는데 사용
- SPOT, lpp_source, mksysb 생성
- rootvg 내에 /export/nim 파일시스템 생성

■ 예문

```
# nim_master_setup -a device=/dev/cd1
# nim_master_setup -a mk_resource=no
# nim_master_setup -a device=/cdrom -B
# nim_master_setup -a volume_group=nimvg -a file_system=/export/NIM
```

```
# nim_master_setup
Usage nim_master_setup: Setup and configure NIM master.
nim_master_setup [-a mk_resource={yes|no}]
[-a file_system=fs_name]
[-a volume_group=vg_name]
[-a disk=disk_name]
[-a device=device]
[-B] [-v]
-B Do not create mksysb resource.
-v Enable debug output.
Default values:
mk_resource = yes
file_system = /export/nim
volume_group = rootvg
device = /dev/cd0
```

AIX V5.2

■ “nim_clients_setup” 명령어

- NIM client 정의하는데 사용
- Installation resource들을 client에 할당
- NIM BOS installation을 initiate

■ 예문

```
# nim_clients_setup -c -r
```

```
# nim_clients_setup -m /export/resource/NIM/530mach.sysb -w client1  
client2
```

```
# nim_client_setup -n
```

Usage nim_clients_setup: Setup and Initialize BOS install for NIM clients.

nim_clients_setup [-m mksysb_resource]

[-c] [-r] [-v] client_objects

-m specify mksysb resource object name -OR- absolute file path.

-c define client objects from client.defs file.

-r reboot client objects for BOS install.

-v Enables debug output.

AIX V5.3

■ “nimsh” (NIM Service Handler)

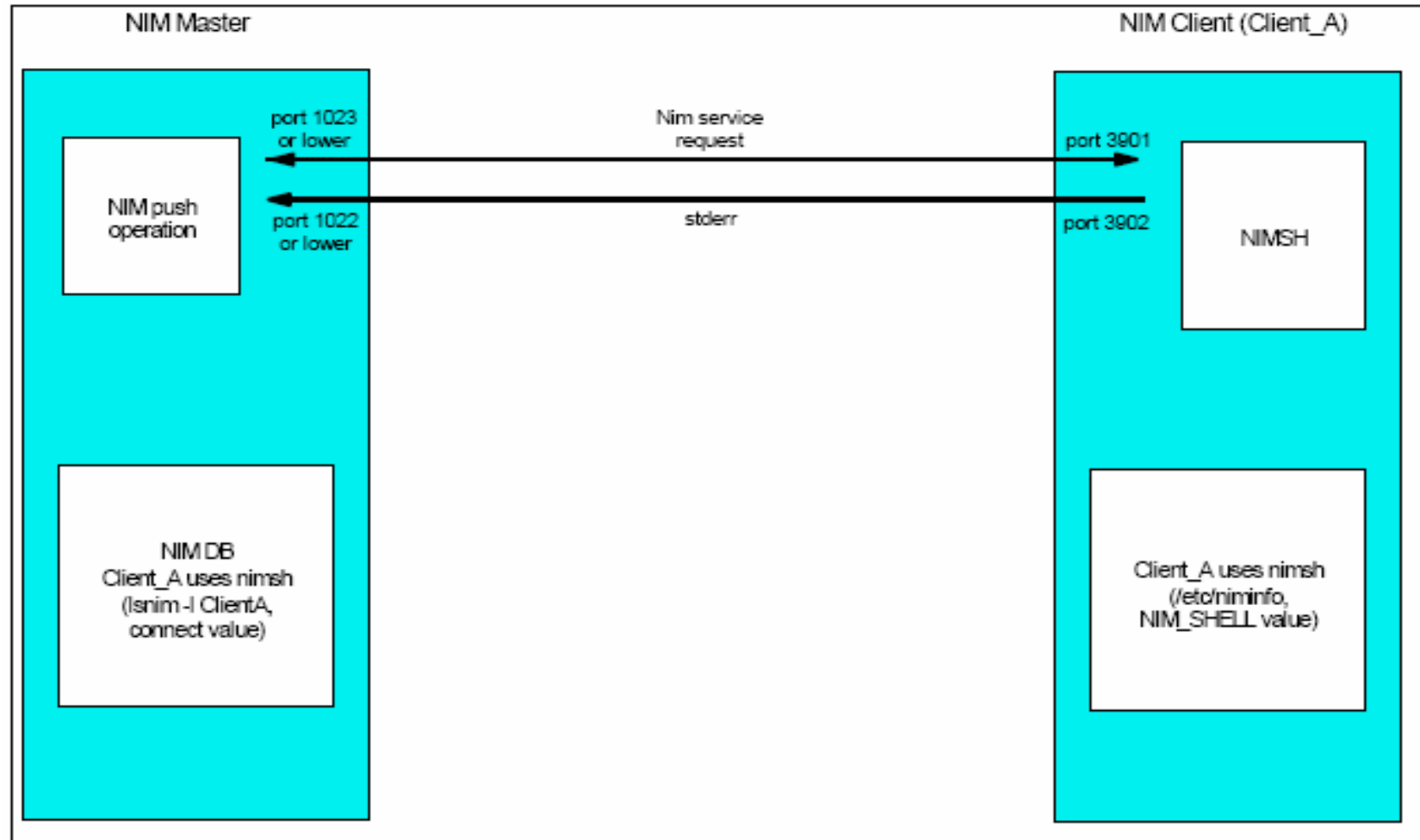
- Push operation시 “rsh”를 사용 (/rhosts) : default
- AIX 5.2 ML07 이상, AIX 5.3 새로운 기능
- Security를 고려한다면, SSL을 구현하여 사용하는 것이 좋다.
- Port 3901, 3902 사용
- 파일 쉘 : bos.sysmgt.nim.client 에 포함되어 있다.
- 기본 “r” 명령어 (rsh, rcp) 사용을 위해 “wrapper” 를 제공한다.
- /usr/lpp/bos.sysmgt/nim/methods 디렉토리에 명령어가 등록된다.
- System Resource Controller(SRC)에 등록 (group name : nimclient)

```
root@GPFS2:/etc> lssrc -g nimclient
Subsystem      Group          PID           Status
nimsh          nimclient      1088588       inoperative
```

- /var/adm/ras/nimsh.log file 참고
- NIM master가 생성하는 packet
 - Client의 hostname, CPUID
 - Master의 CPUID 등

AIX V5.3

- “nimsh” (NIM Service Handler) – 계속...



AIX V5.3

■ “nimsh” (NIM Service Handler) – 계속...

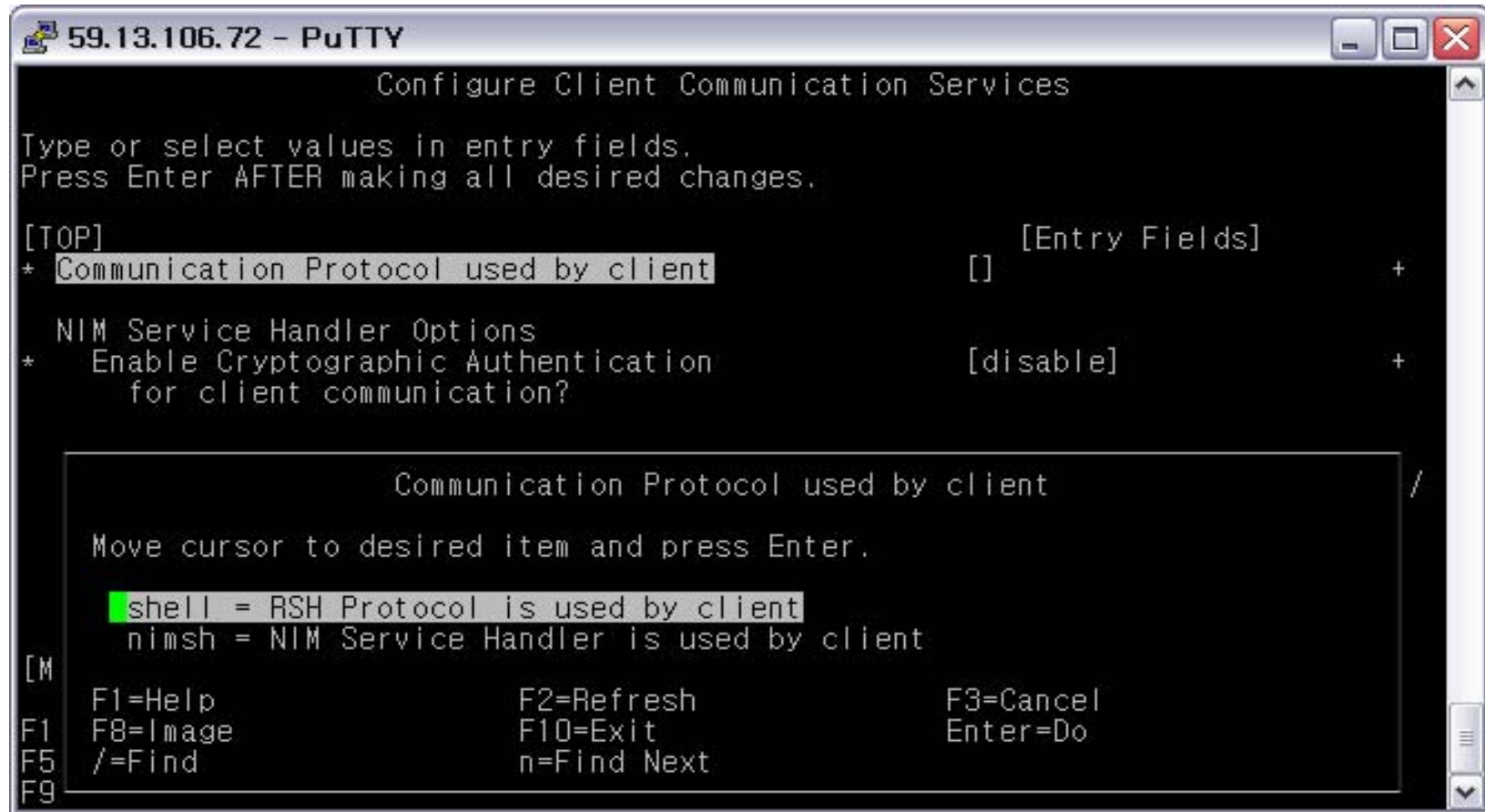
- “smit nim_config_services” ➔ Select nimsh
- 또는, # nimclient -C
- NIMSH를 set up하기 위해서는 client가 미리 구성되어 있어야 하며, AIX 5.2 ML07 이상 또는 AIX 5.3 이상의 버전이 설치되어 있어야 한다.
- 검증 : # lssrc -s nimsh

# lssrc -s nimsh			
Subsystem	Group	PID	Status
nimsh	nimclient	245944	active

- NIMSH가 구성된 후, 더 이상 /.rhosts file이 필요 없다.

AIX V5.3

- “nimsh” (NIM Service Handler) – 계속...
 - “smit nim_config_services” → nimsh를 선택



AIX V5.3

■ Alternate NIM master

- NIM master가 작동하지 않을 시, 백업 NIM master로 takeover하는 기능
- HANIM (High Availability NIM) : heartbeat이 없고, 파일 시스템 이동이 없다.
- Failover과 Fallback이 시스템 관리자에 의해서 수행된다.
- Primary와 같이 backup NIM master에서도 master 로서 nimconfig가 필요.
- smitty nim

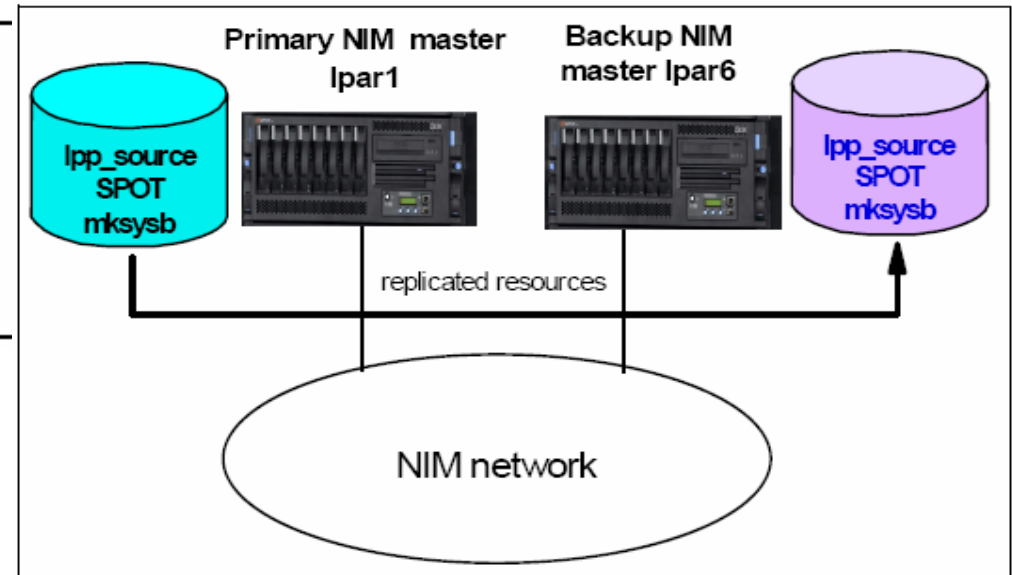
Perform NIM Administration Tasks

Manage Alternate Master Environment

Manage Alternate Master Environment

Move cursor to desired item and press Enter.

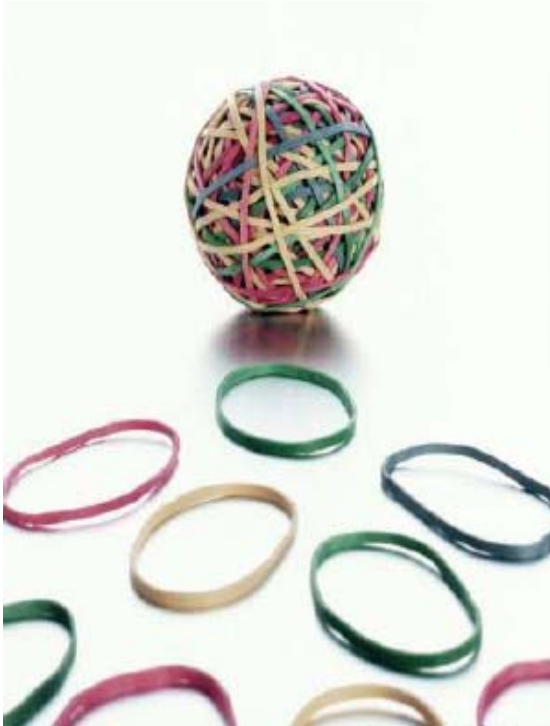
Initialize This Machine as an Alternate Master
 Define Another Machine as an Alternate Master
 Synchronize an Alternate Master's NIM database
 Takeover control of NIM clients from an Alternate Master
 Remove an Alternate Master



AIX V5.3

- lpp_source 생성시 자세한 output이 추가됨
 - Verbose optput 추가
 - # nim -o define -t lpp_source . . . -a show_progress=yes
- mksysb로 부터 SPOT 생성
 - AIX 5.3 이전 : lpp_source나 설치 미디어에서 생성 가능
 - 단점 : disk 공간 소비, 생성시간 길다.
 - lpp_source로 생성된 spot : 400MB, mksysb로 생성된 spot : 50MB
 - mksysb로 생성된 SPOT은 단지, 그 mksysb와 같이 사용할 수 있다.
- NIM을 사용하여 mksysb migration
 - 구 시스템의 mksysb를 신 시스템에 restore하고, migrate한다.
 - AIX4.3이상을 사용하고 있는 지원되지 않는 H/W configuration을 AIX 5.3이 사용되는 지원되는 신규 H/W로 옮길 때 권고하는 방법
- NIM and Service Update Management Assistant
- EZNIM 기능 향상

Agenda



1. NIM 개요
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EZNIM

- Master server 선택
 - /etc/hosts 파일 안에 각각의 client IP 및 hostname을 넣어준다.
- NIM master 설정
 - smit eznim

```

EZ NIM (Easy NIM Tool)
Move cursor to desired item and press Enter.

[ ] Configure as a NIM Master
    Configure as a NIM Client

Configure as a NIM Master
Move cursor to desired item and press Enter.

[ ] Setup the NIM Master environment
    Enable Cryptographic Authentication
    Add fixes to the NIM Master environment
    Add client to the NIM environment

    Update clients
    Backup a client
    Reinstall clients
    Reset clients

    Show the NIM environment
    Verify the NIM environment
    Remove NIM environment
```

EZNIM

■ NIM master 설정 (계속 ...)

- 아래 옵션은 그대로 사용하고 서버에 AIX 원본 CD를 넣고 Enter

```
Easy NIM - Setup the NIM Master environment

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
Select or specify software source to initialize environment  [cd0] +
Select Volume Group for resources                             [rootvg] +
Select Filesystem for resources                               [/export/eznim]
Options
  CREATE system backup image?                                [yes] +
  CREATE new Filesystem?                                       [yes] +
  DISPLAY verbose output?                                     [no] +
```

EZNIM

■ NIM master 설정 (계속 ...)

- 아래와 같이 자동으로 NIM master setup이 실행된다.
- Default로 만들어지는 /export/eznim 파일시스템은 JFS type이라서 하나의 File size가 2G를 초과할 수 없다. 그래서 error가 발생한다. 미리 JFS2 type로 /export/eznim 파일시스템을 만들어서 사용하는 것이 편리하다.
- 시스템에서 자동으로 파일시스템을 만들어서 nim관련 정보와 SPOT, mkysyb 소스 파일을 만들어 준다. /export/eznim 및 /tftpboot 파일시스템이 자동으로 생성된다.
- 진행과정은 tail -f /var/adm/ras/nim.setup을 보면 된다.

COMMAND STATUS

Command: **running** stdout: yes stderr: no

Before command completion, additional instructions may appear below.

```
##### NIM master setup #####
#
# During script execution, lpp_source and spot resource creation times
# may vary. To view the install log at any time during nim_master_setup,
# run the command: tail -f /var/adm/ras/nim.setup in a separate screen.
#
#####
Creating image.data file...Expanding /tmp.
Filesystem size changed to 1048576
█
```

EZNIM

■ Client 추가

- smit eznim → Configure as a NIM Master → Add client to the NIM Environment

```
                                EZ NIM (Easy NIM Tool)

Move cursor to desired item and press Enter.

[ ] Configure as a NIM Master
    Configure as a NIM Client
```

```
                                Configure as a NIM Master

Move cursor to desired item and press Enter.

    Setup the NIM Master environment
    Enable Cryptographic Authentication
    Add fixes to the NIM Master environment
    [ ] Add client to the NIM environment

    Update clients
    Backup a client
    Reinstall clients
    Reset clients

    Show the NIM environment
    Verify the NIM environment
    Remove NIM environment
```

EZNIM

■ Client 추가 (계속 ...)

- 아래 화면에서, Client hostname을 입력한다.
- 다음 화면에서 Kernel to use for Network Boot 값과, cable type, address를 넣어준다

Define a Machine

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

[Entry Fields]

* Host Name of Machine []
(Primary Network Install Interface)

Define a Machine

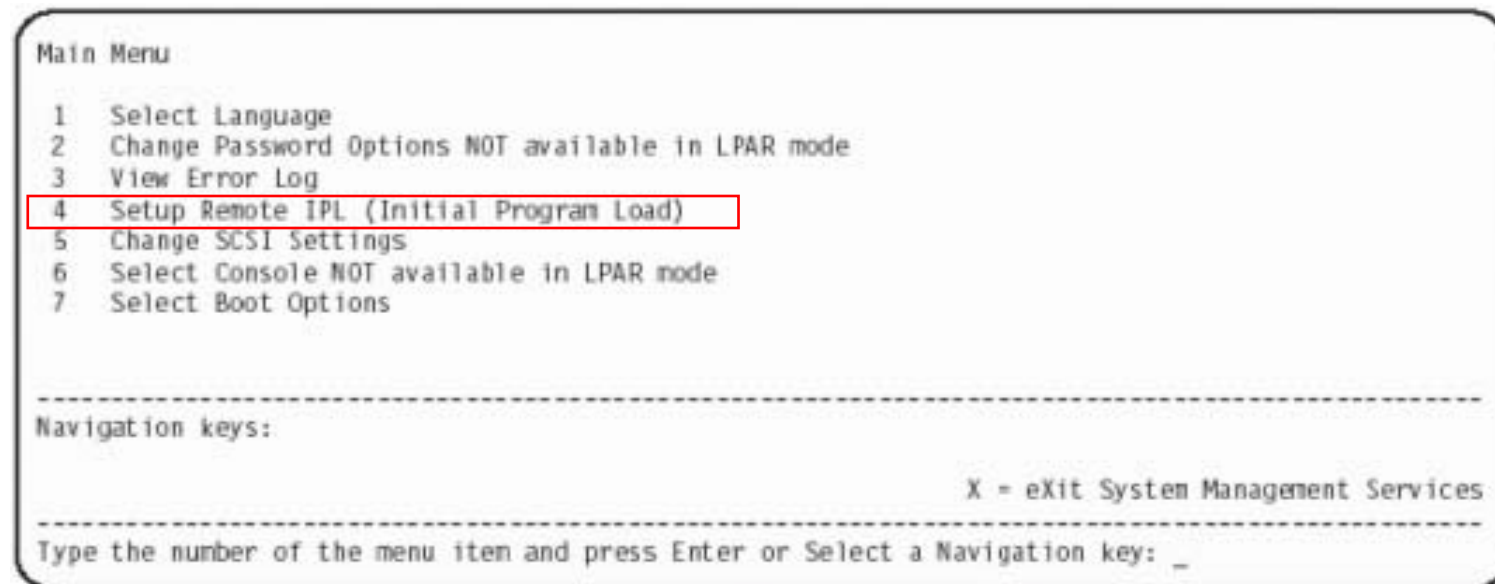
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]

* NIM Machine Name	[dlpar02]
* Machine Type	[standalone]
* Hardware Platform Type	[chrp]
Kernel to use for Network Boot	[up]
Primary Network Install Interface	
* Cable Type	bnc
Network Speed Setting	[]
Network Duplex Setting	[]
* NIM Network	master_net
* Host Name	dlpar02
Network Adapter Hardware Address	[0]
Network Adapter Logical Device Name	[]
IPL ROM Emulation Device	[]
CPU Id	[]
Machine Group	[]
Comments	[]

EZNIM

- Master 에서
 - Isnim으로 master setting 확인
 - Isnim -l hostname(dlpar04) 로 확인
- Client 에서 작업할 내용
 - mksysb를 넣을 client에 SMS 모드로 들어간다.
 - Main Menu에서 4번 Setup Remote IPL (initial Program Load) 선택



EZNIM

■ Client 에서 작업할 내용 (계속 ...)

- 1번 IP Parameters에 들어가서 다음 값들을 넣어준다.
 - 1. Client IP address (mksysb image 넣을 서버)
 - 2. Server IP address (master 서버)
 - 3. Gateway IP address
 - 4. subnet Mask값

The image shows two overlapping terminal windows from the EZNIM utility. The background window is titled 'Network Parameters' and lists three options: '1. IP Parameters' (highlighted with a red box), '2. Adapter Parameters', and '3. Ping Test'. Below this, it provides navigation keys: 'M = return to main menu' and 'ESC key = return to previous s', followed by the instruction 'Type the number of the menu it'. The foreground window is titled 'IP Parameters' and displays four fields with their current values: '1. Client IP Address [000.000.000.000]', '2. Server IP Address [000.000.000.000]', '3. Gateway IP Address [000.000.000.000]', and '4. Subnet Mask [255.255.255.000]'. It also includes the same navigation keys and a final instruction: 'Type the number of the menu item and press Enter or Select a Navigation key:'. At the bottom right of the foreground window, there is a small status bar with the text 'X = eXit System Management Services' and some graphical icons.

```
Network Parameters
1. IP Parameters
2. Adapter Parameters
3. Ping Test

-----
Navigation keys:
M = return to main menu
ESC key = return to previous s
-----
Type the number of the menu it

IP Parameters
1. Client IP Address      [000.000.000.000]
2. Server IP Address     [000.000.000.000]
3. Gateway IP Address    [000.000.000.000]
4. Subnet Mask           [255.255.255.000]

-----
Navigation keys:
M = return to main menu
ESC key = return to previous screen
X = eXit System Management Services
-----
Type the number of the menu item and press Enter or Select a Navigation key:
-----
```

EZNIM

■ Client 에서 작업할 내용 (계속 ...)

– 2번 adapter parameters를 선택

- Client adapter의 hardware address를 메모지에 기입해 둔다. (이것은 master서버에서 Add client to the NIM environment시 필요하다)
- 사용할 adapter 선택

Network Parameters

1. IP Parameters
2. Adapter Parameters
3. Ping Test

Navigation keys:
M = return to main menu
ESC key = return to previous

Type the number of the menu item and press Enter or Select a Navigation key: _

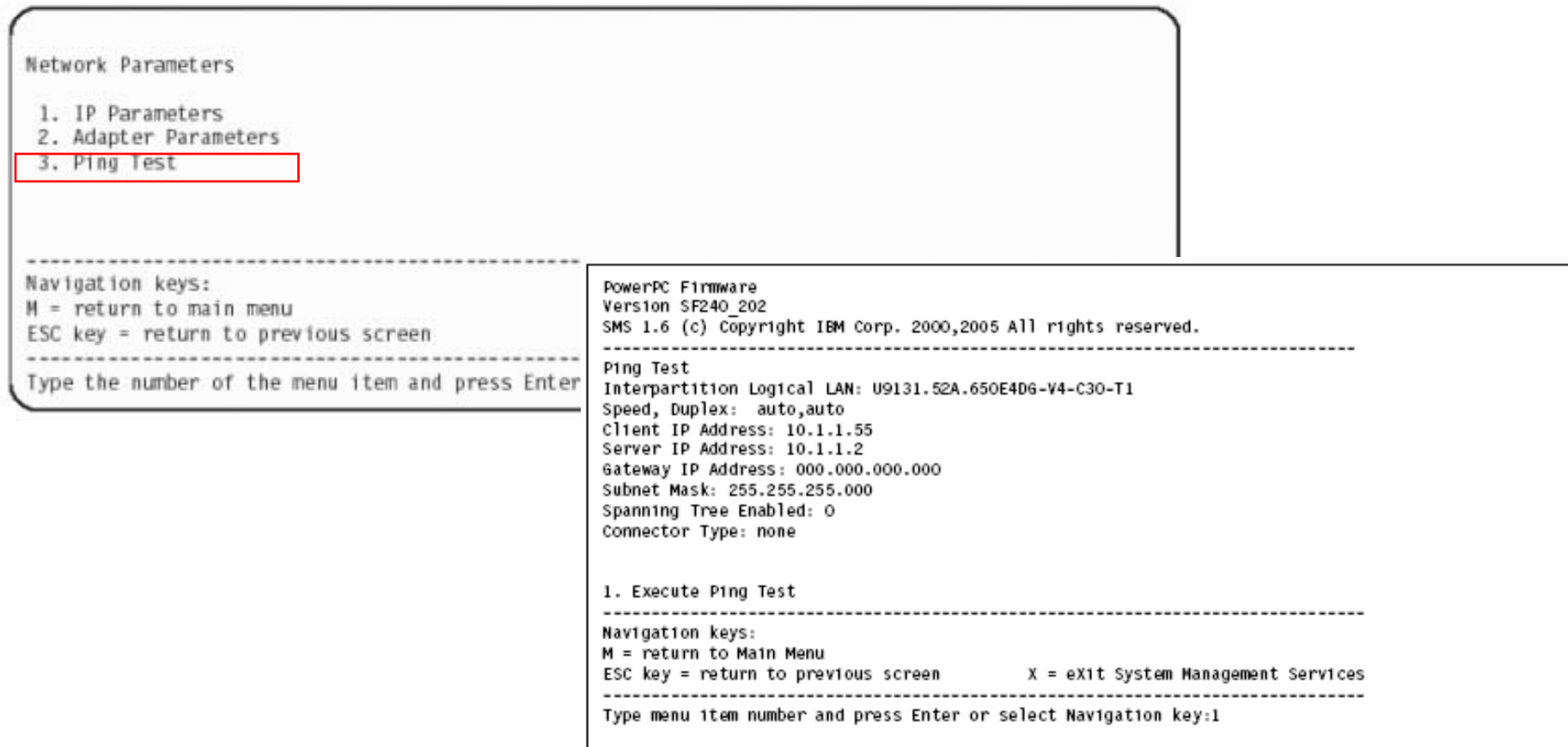
Device	Slot	Hardware Address
1. 10/100 Mbps Ethernet PCI Adapter II	4:U0.1-P1-I4/E1	000629aca72d
2. 10/100 Ethernet Adapter	Integrated:U0.1-P1/E1	0020357A0530
3. High Speed Token-Ring Adapter	1:U0.1-P1-I1/T1	000629be04e1
4. Gigabit Ethernet PCI Adapter	3:U0.1-P1-I3/E1	0004ac7c9ec7

Navigation keys:
M = return to main menu
ESC key = return to previous screen
X = eXit System Management Services

Type the number of the menu item and press Enter or Select a Navigation key: _

EZNIM

- Client 에서 작업할 내용 (계속 ...)
 - 빠져 나와서, 3번 ping test를 해본다.



EZNIM

- Client 에서 작업할 내용 (계속 ...)
 - Success가 떨어지면, O.K

```
$PING: args = /vdevice/l-lan@3000001e:10.1.1.2,10.1.1.55,000.000.000.000  
  
NET: Device String - /vdevice/l-lan@3000001e  
NET: Ping timeout - 10000 msec  
  
NET: Ping string - h,10.1.1.2,10.1.1.55,000.000.000.000  
PING: chosen-network-type = ethernet,auto,none,auto  
PING: client      IP = 10.1.1.55  
PING: server      IP = 10.1.1.2  
PING: gateway     IP = 0.0.0.0  
  
PING: device      /vdevice/l-lan@3000001e  
PING: loc-code    U9131.52A.650E4D6-V4-C30-T1  
  
PING: Ready to ping:  
PING: source hardware address is 1a 8c fo 0 40 1e  
PING: destination hardware address is 1a 8c fo 0 30 1e  
PING: source IP address is 10.1.1.55  
PING: destination IP address is 10.1.1.2
```

Ping Success.

Press any key to continue.....

EZNIM

- Client 에서 작업할 내용 (계속 ...)
 - Main Menu에서 5. Select boot options 선택
 - 1. Select Install?Boot Device를 선택

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Main Menu

1. Select Language
2. Setup Remote IPL (Initial Program Load)
3. Change SCSI Settings
4. Select Console
5. Select Boot Options

Navigation Keys:

X = eXit Sys

Type menu item number and press Enter or select Navigat

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Multiboot

1. Select Install/Boot Device
2. Configure Boot Device Order
3. Multiboot Startup <OFF>

Navigation keys:

M = return to Main Menu

ESC key = return to previous screen

X = eXit System Management Services

Type menu item number and press Enter or select Navigation key:1

EZNIM

■ Client 에서 작업할 내용 (계속 ...)

- 6. Network 선택
- ethernet 선택

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Select Device Type

1. Diskette
2. Tape
3. CD/DVD
4. IDE
5. Hard Drive
6. Network
7. List all Devices

Navigation keys:

M = return to Main Menu

ESC key = return to previous screen X = eXit Sys

Type menu item number and press Enter or select Navigati

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Select Device

Device	Current	Device
--------	---------	--------

Number	Position	Name
--------	----------	------

1.	-	Virtual Ethernet (loc=U9131.52A.650E4D6-V4-C30-T1)
----	---	---

Navigation keys:

M = return to Main Menu

ESC key = return to previous screen X = eXit System Management Services

Type menu item number and press Enter or select Navigation key:1

EZNIM

- Client 에서 작업할 내용 (계속 ...)
 - Select Task화면에서,
 - 2. Normal Mode Boot 선택
 - 1. Yes 선택 → Network Boot (IPL)이 진행된다.

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Select Task

Virtual Ethernet
(loc=U9131.52A.650E4D6-V4-C30-T1)

- 1. Information
- 2. Normal Mode Boot
- 3. Service Mode Boot

Navigation keys:
M = return to Main Menu
ESC key = return to previous screen X = eXit !

Type menu item number and press Enter or select Naviga

```
PowerPC Firmware
Version SF240_202
SMS 1.6 (c) Copyright IBM Corp. 2000,2005 All rights reserved.
```

Are you sure you want to exit System Management Services?

- 1. Yes
- 2. No

Navigation Keys:

X = eXit System Management Services

Type menu item number and press Enter or select Navigation key:1

EZNIM

■ Master server에서

- smit nim
 - Perform NIM Software Installation and Maintenance Tasks 선택
 - Install and Update Software 선택

```
Network Installation Management

Move cursor to desired item and press Enter.

Configure the NIM Environment
[ ] Perform NIM Software Installation and Maintenance Tasks
Perform NIM Administration Tasks
Create IPL ROM Emulation Media
NIM POWER5 Tools

Perform NIM Software Installation and Maintenance Tasks

Move cursor to desired item and press Enter.

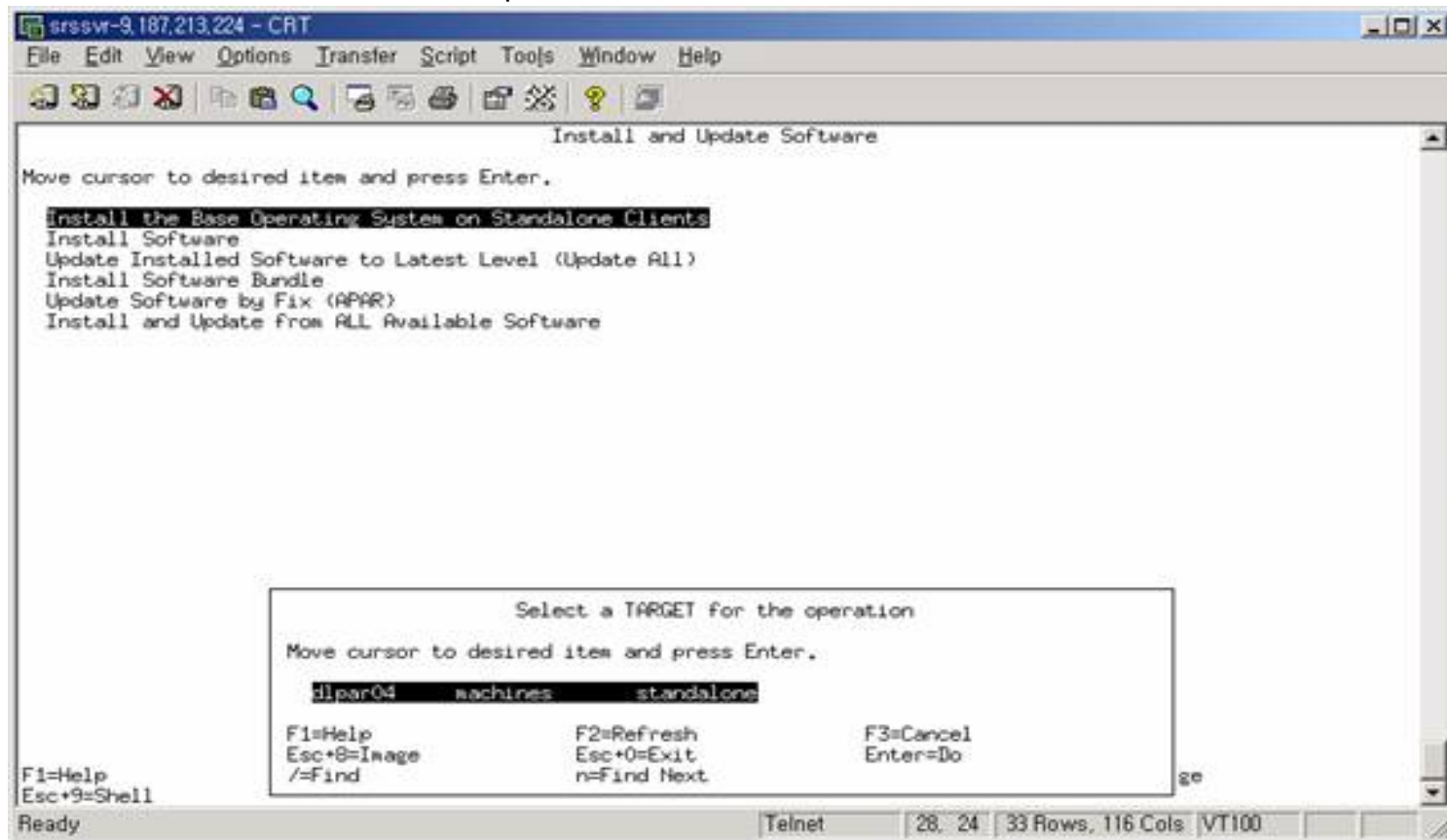
[ ] Install and Update Software
List Software and Related Information
Software Maintenance and Utilities
Alternate Disk Installation
Manage Diskless/Dataless Machines
```

EZNIM

■ Master server에서 (계속 ...)

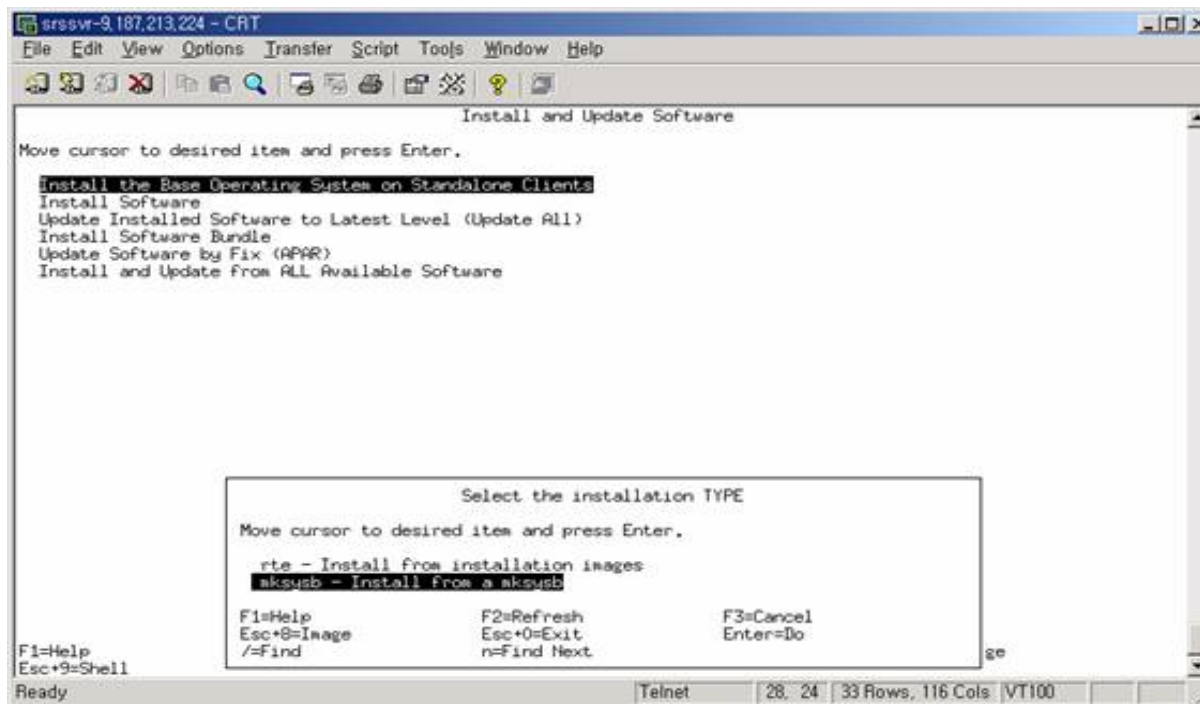
– smit nim (계속 ...)

- Install the Base Operating System on Standalone Clients 선택
- Select a TARGET for the operation



EZNIM

- Master server에서 (계속 ...)
 - smit nim (계속 ...)
 - mksysb – Install from a mksysb 선택 후, enter



- 참고사항
 - rte : install from installation image를 선택하면 lpp_source에서 AIX 원본 CD를 install하는 것과 같음
 - mksysb – install from a mksysb : mksysb image로 install

- BOOTP를 issue (master내에 있는 /etc/bootptab 참고)
- TFTP를 issue (image가 master에서 client로 전송됨) ➔ 12Mbytes

```

BOOTP: chosen-network-type = ethernet,auto,non
BOOTP: server IP = 10.1.1.2
BOOTP: requested filename =
BOOTP: client IP = 10.1.1.55
BOOTP: client HW addr = 1a 8c f0 0 40 1e
BOOTP: gateway IP = 0.0.0.0
BOOTP: device /vdevice/l-lan03000001e
BOOTP: loc-code U9131.52A.650E4D6-V4-C30-T1

```

```

BOOTP: chosen-network-type = ethernet,auto,none,auto
BOOTP: server IP = 10.1.1.2
BOOTP: requested filename =
BOOTP: client IP = 10.1.1.55
BOOTP: client HW addr = 1a 8c f0 0 40 1e
BOOTP: gateway IP = 0.0.0.0
BOOTP: device /vdevice/1-lan03000001e
BOOTP: loc-code U9131.52A.650E406-V4-C30-T1

```

```
FILE: /tftpboot/LPAR55
FINAL Packet Count = 23852
FINAL File Size = 12211712 bytes.
load-base=0x4000
real-base=0x2000000
```

```

Welcome to AIX.
boot image timestamp: 14:57 06/13

```

EZNIM

■ Client에서 (계속 ...)

- 전송된 AIX kernel로 설치가 진행된다.
- NIM mksysb resource를 사용하여 설치가 진행된다.

```

BOO TP R = 1 BOO TP S = 2
FILE: /tftpboot/LPAR55
FINAL Packet Count = 23852
FINAL File Size = 12211712 bytes.
load-base=0x4000
real-base=0x2000000

```

Elapsed time since release of system processors: 18292 mins 43 secs

```

-----
                Welcome to AIX.
                boot image timestamp: 14:57 06/13
                The current time and date: 07:38:53 06/14/2006
                number of processors: 1    size of memory: 512MB
boot device: /vdevice/l-lan03000001e:10.1.1.2,,10.1.1.55,000.000.000,00,00
                kernel size: 11008898; 32 bit kernel
-----

```

Installing Base Operating System

Please wait...

Approximate % tasks complete	Elapsed time (in minutes)	
16	1	13% of mksysb data restored.

EZNIM

■ Client에서 (계속 ...)

- 설치가 끝나면 시스템이 rebooting된다.
- 새롭게 설치된 kernel로 booting된다.

Installing Base Operating System

Please wait...

Approximate % tasks complete	Elapsed time (in minutes)	
90	13	Creating boot image. Installing Base Operating System

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 forced unmount of /var

Welcome to AIX.

boot image timestamp: 07:53 06/14

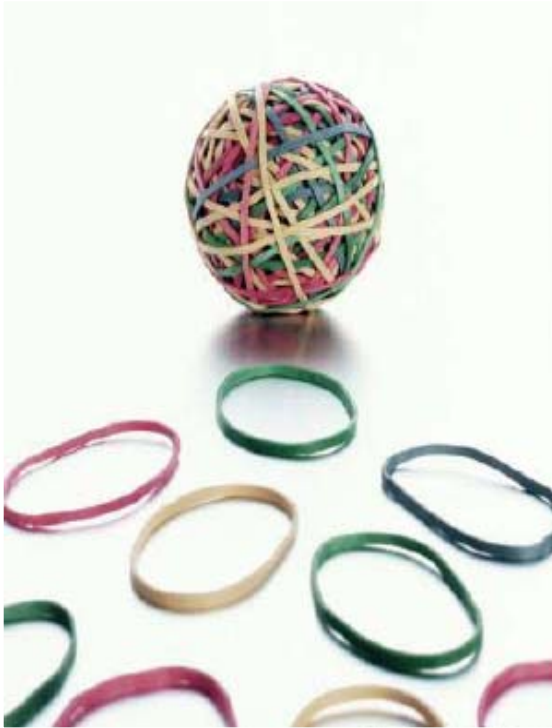
The current time and date: 07:55:12 06/14/2006

number of processors: 1 size of memory: 512MB

boot device: /vdevice/v-scs1030000016/disk0810000000000000:2

kernel size: 13425263; 64 bit kernel

Agenda



1. NIM 개요
2. NIM 개념 및 정의
3. Version별 신규 및 개선 기능
4. EZNIM
5. NIM 시나리오

시나리오 1 : 신규 시스템 도입시

■ 서버 도입 시 / LPAR 로 재구성 시

- 모든 서버가 동일한 OS version/image로 설치 가능
 - E-fix level 까지 구성 가능
- Font 문제, Xmanager 문제 등을 gold image를 가지고 있음으로써 해결 가능
- CD-ROM이 없어서 문제인 경우, LPAR에서 resource 할당 없이 시스템 OS 설치 가능
 - 특정시스템 (예:6M2) 의 경우, LPAR로 CD-ROM을 공유하지 못하는 문제 해결

■ TL (technology level) upgrade나 migration 시

- 별도의 device가 없어도 network를 통해서 migration 가능
- 여러 서버를 동시에 migration 가능 (속도 개선)

■ fix 나 e-fix 적용 시

- 별도의 device가 없어도 network를 통해서 migration 가능
- 여러 서버에 동일한 fix, e-fix적용 가능

시나리오 2 : Client Server의 boot image가 손상을 입었을 때

- Network 를 통해 바로 diag booting 가능
 - Maintenance Mode에서 diagnostics 가능
 - 항상 동일 version/최신 version이 확보되어 있으므로, 언제든지 booting 가능
 - Device, media (cdrom, tape)을 별도로 보관할 필요가 없음
-
- 참조) 타사사례 : 현재 설치된 version과 다른 version 으로 booting함으로써 시스템 복구 시간이 길어짐.
 - 고객사에 동일 version의 CD나 시스템 백업 (mksysb) 이미지가 없었음.

시나리오 3 : 시스템 백업시

- 분기별/필요 시 백업 이미지를 보관 가능
 - crontab에 등록하여 자동화
- 백업 이미지를 받은 후, remote로 전송하여 보관 가능
 - Remote image로 복구 가능
- 별도의 장치가 필요 없음. (network를 사용)

시나리오 4 : Client의 rootvg가 손상을 입었을 때

- Master server에 있는 boot image를 이용하여 booting을 한 후, 미리 백업해 놓은 client server의 시스템 백업 이미지(mksysb)를 이용하여 원상 복구
 - 빠른 시간 내에 복구 가능
 - Tape나 CD-ROM이 없는 경우에도 backup 가능
- 참조) 백업 소산을 위해 직접 tape 으로 백업을 받을 필요성이 없어짐

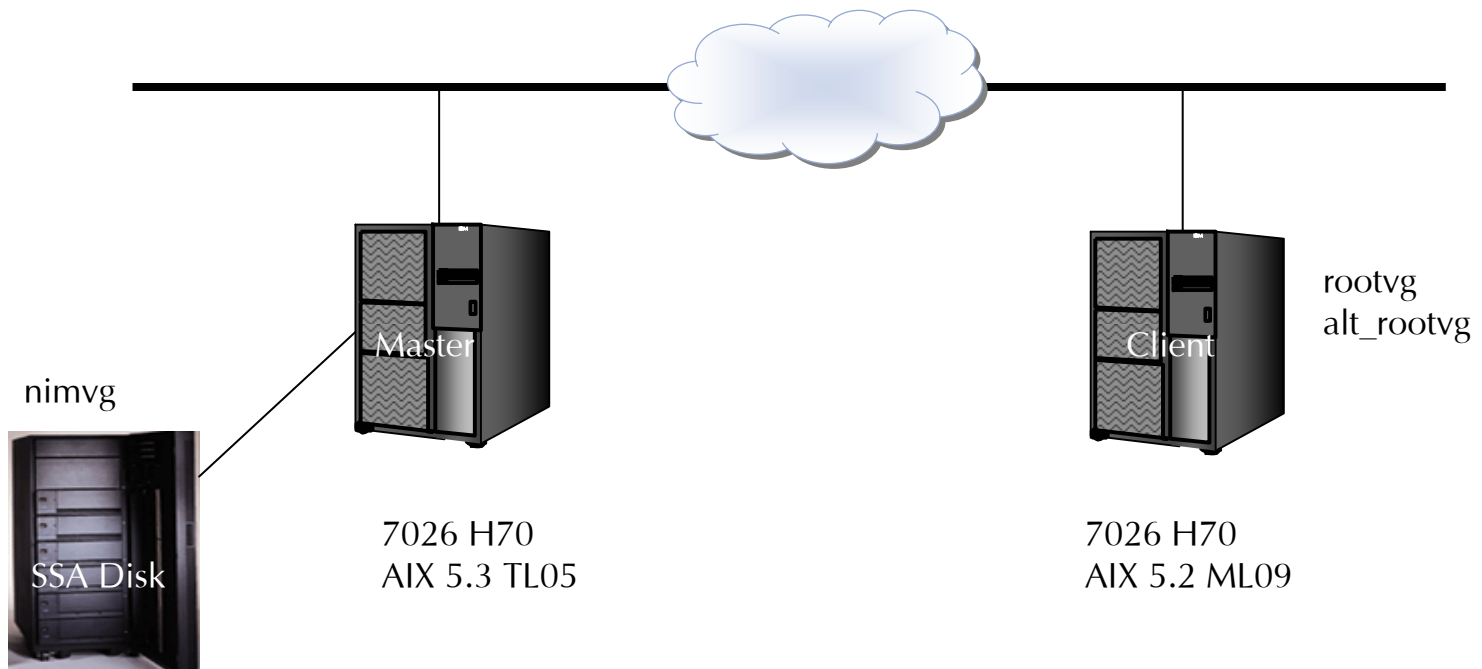
시나리오 5 : 동일 image와 fileset 설치

- 기존 서버의 fileset을 모두 가지고 와서, 새로운 lpp_source 설정 가능
- 기존의 AIX image 중 원하는 fileset을 설치가능
 - 참조) 타사사례 :
 - vac, java version, 시스템 별로 fileset이 달라 장애 시 원인 규명이 힘들.
 - 개발 서버, 테스트서버, 운영서버마다 install되어야 하는 fileset이 다름
 - 서버와 동일한 fileset을 가지고 싶을 때



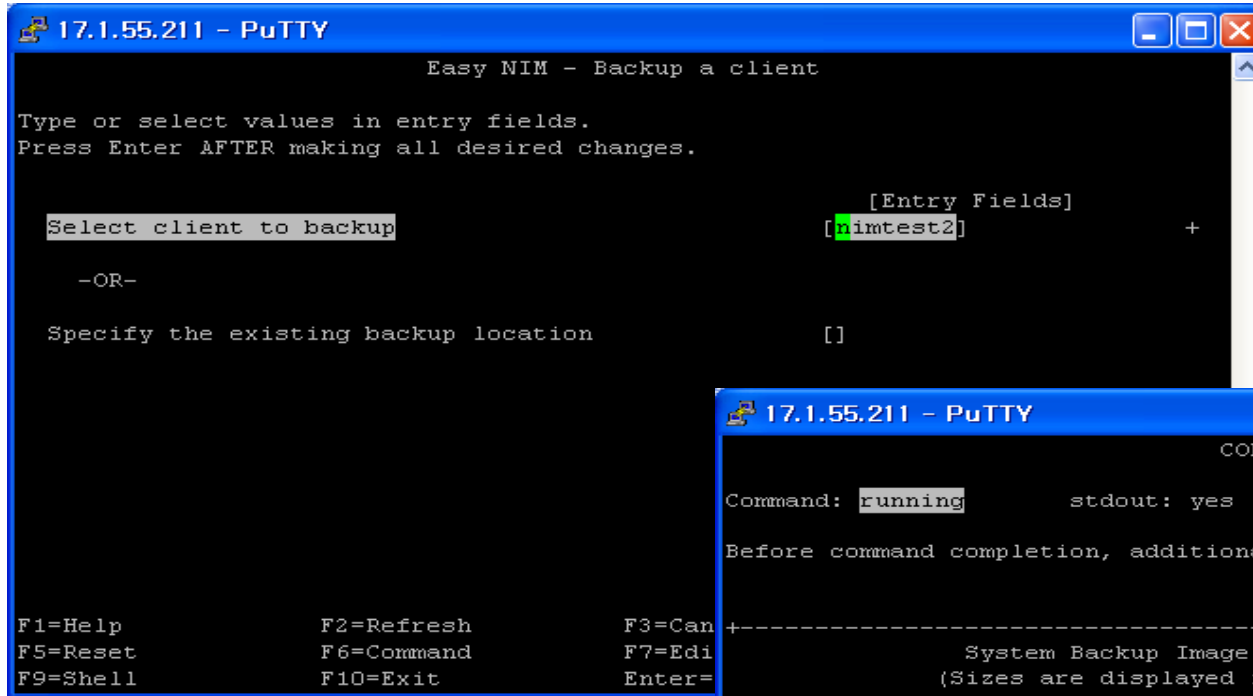
테스트 시나리오 1

- Master에서 client의 system backup 수행 (mksysb)
 - AIX 5.2 ML09
 - Master에서 client의 system backup 수행
 - 구성도



테스트 시나리오 1

- Master에서 client의 system backup 수행 (mksysb) – 계속...



```

17.1.55.211 - PuTTY
Easy NIM - Backup a client

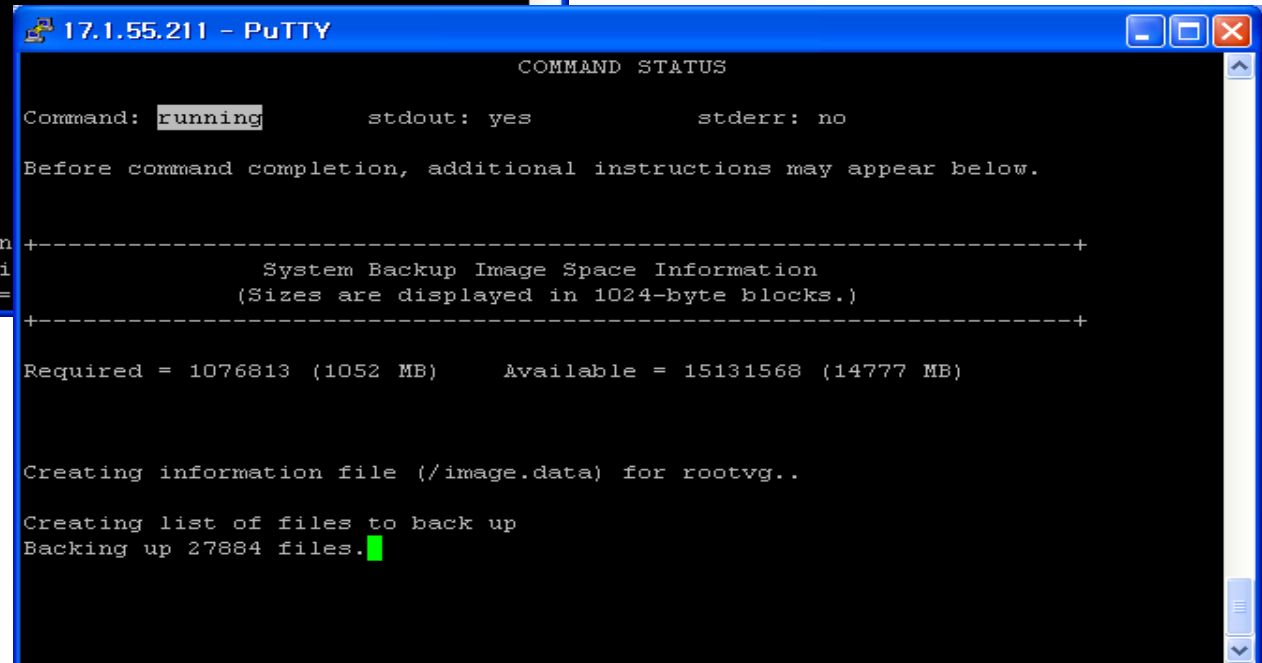
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
Select client to backup      [nimtest2]      +
-OR-
Specify the existing backup location      []

F1=Help      F2=Refresh      F3=Can
F5=Reset      F6=Command      F7=Edi
F9=Shell      F10=Exit      Enter=
  
```

master에서 nim을 이용한 client mksysb backup

master에서 client의 mksysb 시작



```

17.1.55.211 - PuTTY
COMMAND STATUS

Command: running      stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

-----+
System Backup Image Space Information
(Sizes are displayed in 1024-byte blocks.)
-----+

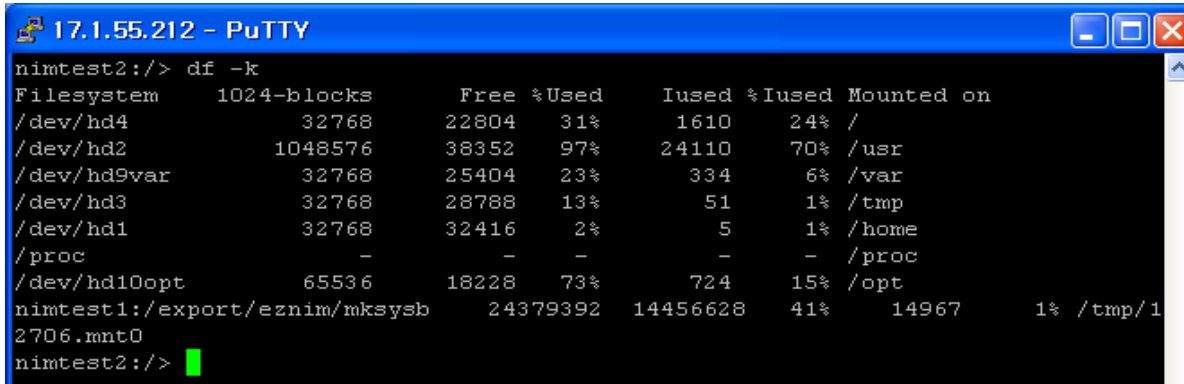
Required = 1076813 (1052 MB)      Available = 15131568 (14777 MB)

Creating information file (/image.data) for rootvg..

Creating list of files to back up
Backing up 27884 files.█
  
```

테스트 시나리오 1

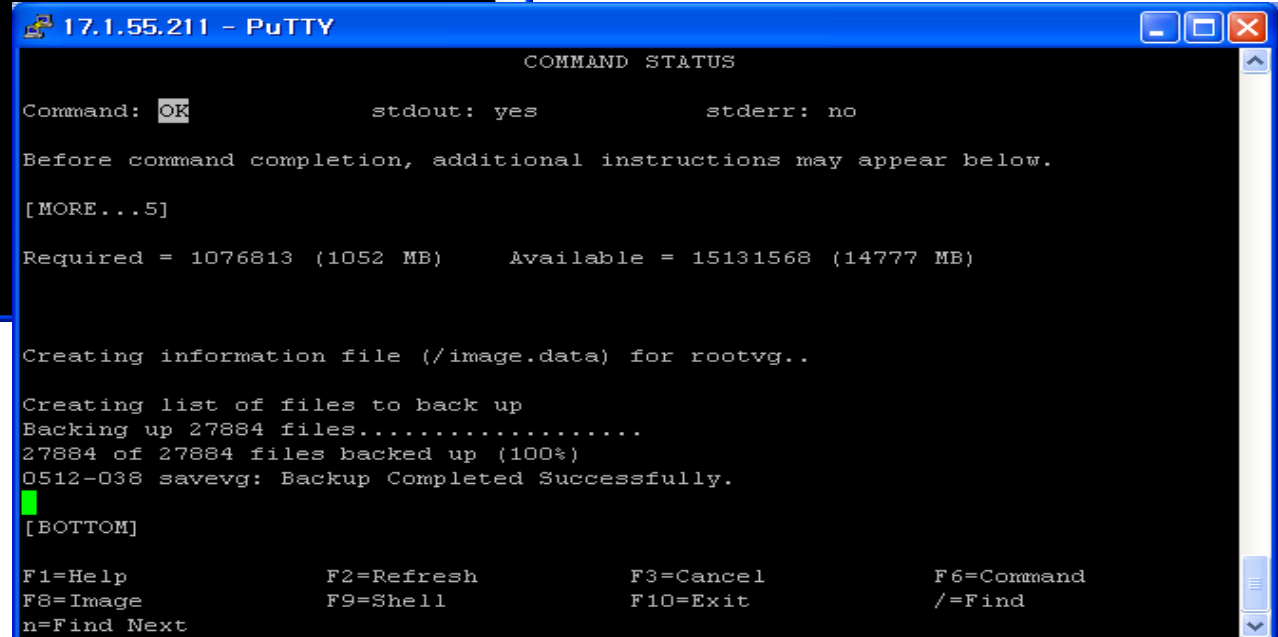
- Master에서 client의 system backup 수행 (mksysb) – 계속...



```

17.1.55.212 - PuTTY
nimtest2:/> df -k
Filesystem      1024-blocks    Free %Used    Iused %Iused Mounted on
/dev/hd4         32768       22804   31%      1610    24% /
/dev/hd2       1048576       38352   97%     24110    70% /usr
/dev/hd9var      32768       25404   23%       334     6% /var
/dev/hd3         32768       28788   13%        51     1% /tmp
/dev/hd1         32768       32416    2%         5     1% /home
/proc            -           -     -         -     - /proc
/dev/hd10opt     65536       18228   73%       724    15% /opt
nimtest1:/export/eznim/mksysb 24379392 14456628 41%    14967    1% /tmp/1
2706.mnt0
nimtest2:/>
  
```

master에서 client의 mksysb backup 완료



```

17.1.55.211 - PuTTY
COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

[MORE...5]

Required = 1076813 (1052 MB)    Available = 15131568 (14777 MB)

Creating information file (/image.data) for rootvg..

Creating list of files to back up
Backing up 27884 files.....
27884 of 27884 files backed up (100%)
0512-038 savevg: Backup Completed Successfully.

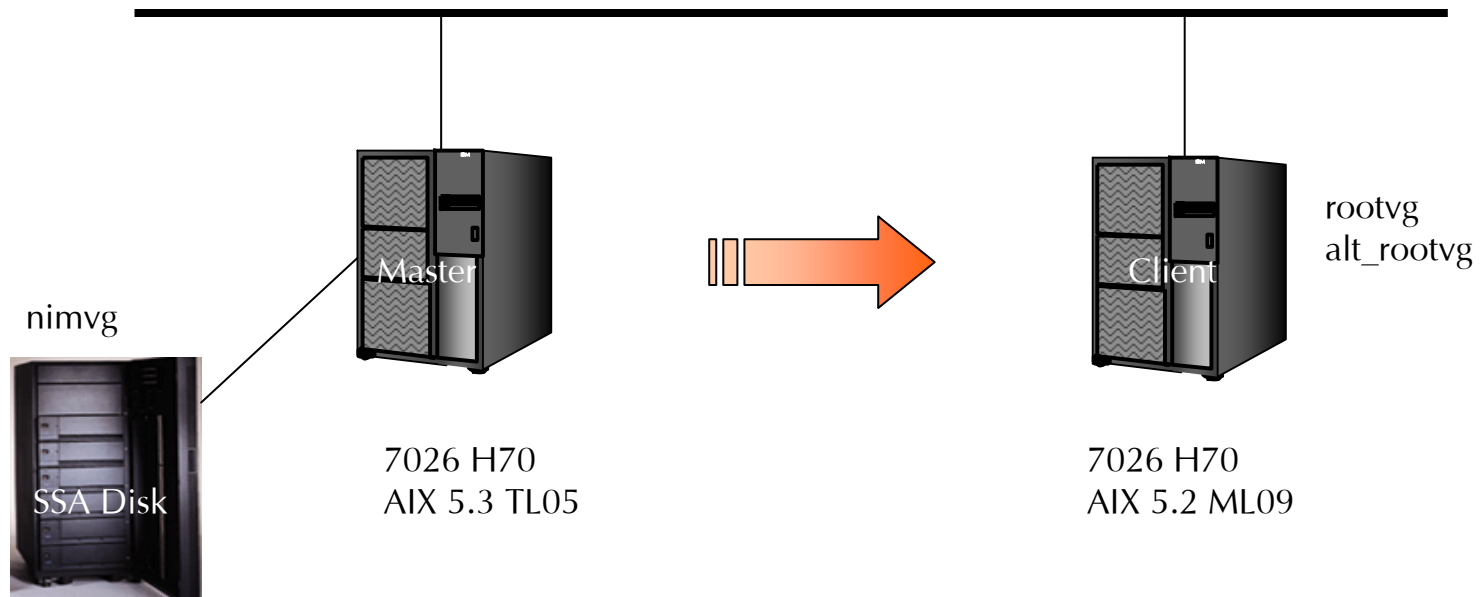
[BOTTOM]

F1=Help      F2=Refresh    F3=Cancel    F6=Command
F8=Image     F9=Shell      F10=Exit     /=Find
n=Find Next
  
```

nfs 통해 client에서 master로 rootvg
image가 backup되는 모습

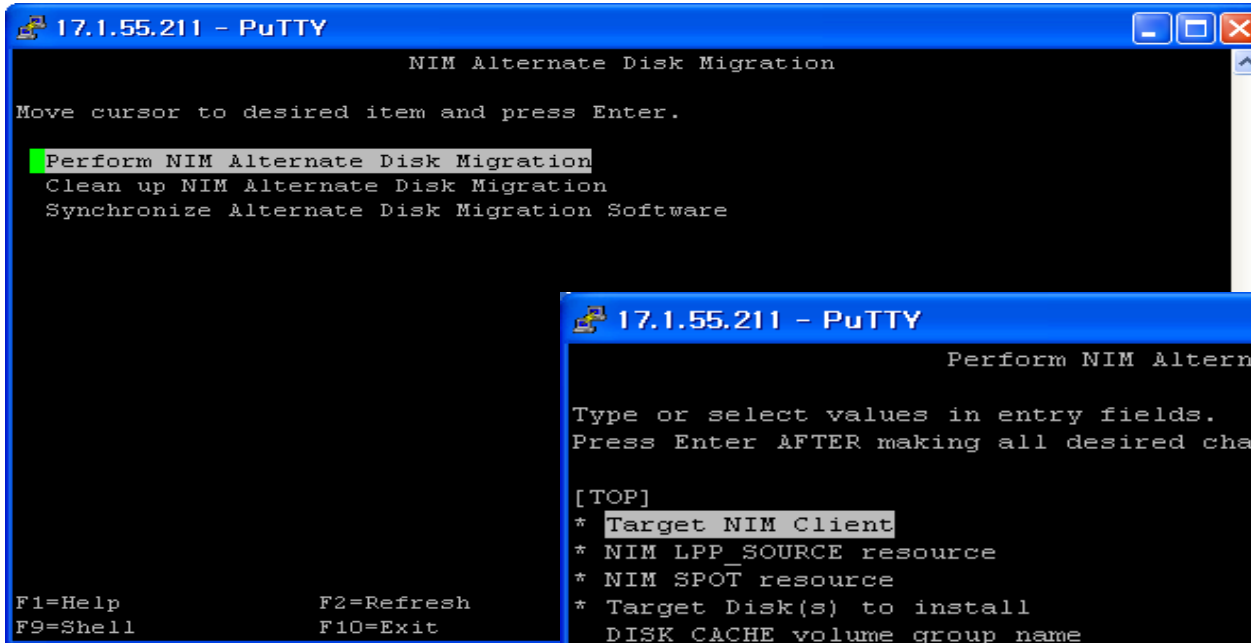
테스트 시나리오 2

- alt_disk를 이용한 O/S migration
 - aIX 5.2 ML09 → AIX 5.3 TL05
 - alt_disk를 이용하여 O/S migration 을 수행
 - 구성도



테스트 시나리오 2

■ alt_disk를 이용한 O/S migration (계속 ...)



```

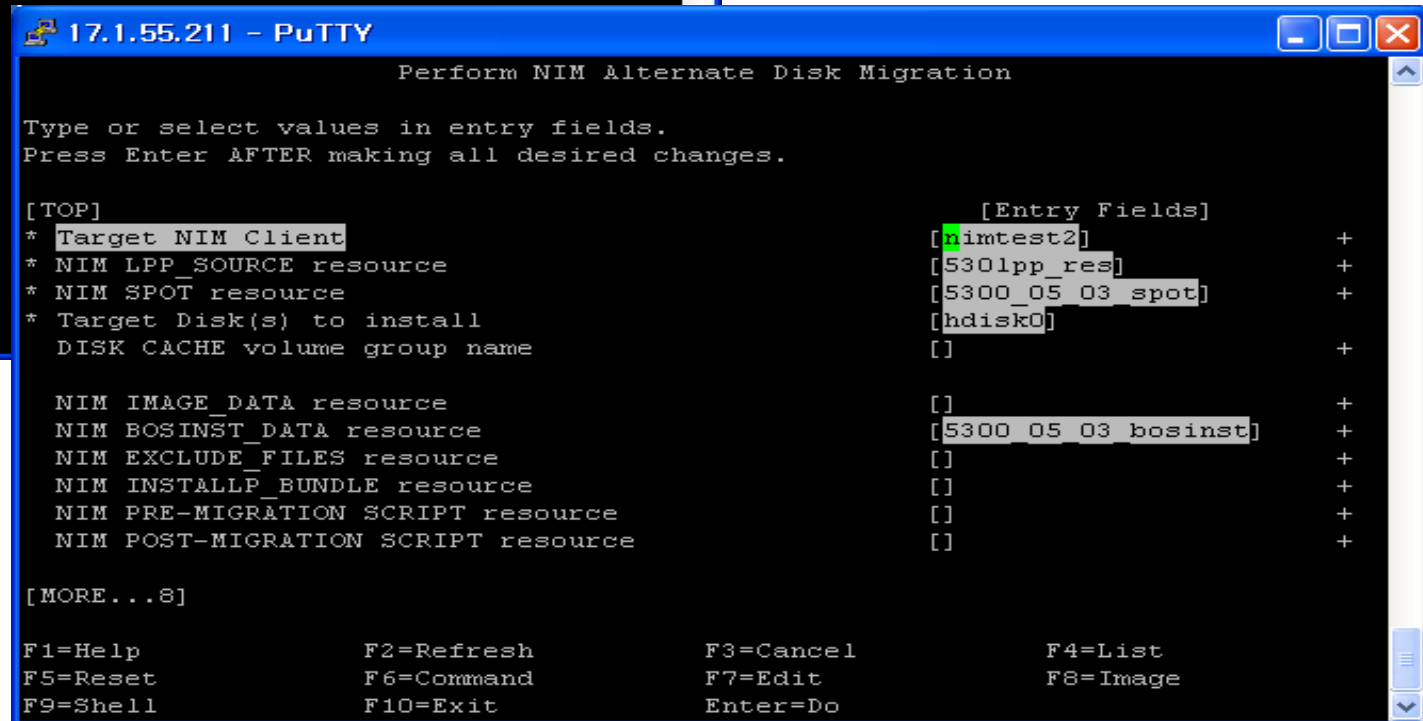
17.1.55.211 - PuTTY
NIM Alternate Disk Migration

Move cursor to desired item and press Enter.

Perform NIM Alternate Disk Migration
Clean up NIM Alternate Disk Migration
Synchronize Alternate Disk Migration Software

F1=Help      F2=Refresh
F9=Shell     F10=Exit
  
```

Target client 및 migration source 지정



```

17.1.55.211 - PuTTY
Perform NIM Alternate Disk Migration

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[ TOP ]
* Target NIM Client
* NIM LPP_SOURCE resource
* NIM SPOT resource
* Target Disk(s) to install
  DISK CACHE volume group name

NIM IMAGE_DATA resource
NIM BOSINST_DATA resource
NIM EXCLUDE_FILES resource
NIM INSTALLP_BUNDLE resource
NIM PRE-MIGRATION SCRIPT resource
NIM POST-MIGRATION SCRIPT resource

[Entry Fields]
[nimtest2]
[530lpp_res]
[5300_05 03 spot]
[hdisk0]
[]

NIM IMAGE_DATA resource []
NIM BOSINST_DATA resource [5300_05 03 bosinst]
NIM EXCLUDE_FILES resource []
NIM INSTALLP_BUNDLE resource []
NIM PRE-MIGRATION SCRIPT resource []
NIM POST-MIGRATION SCRIPT resource []

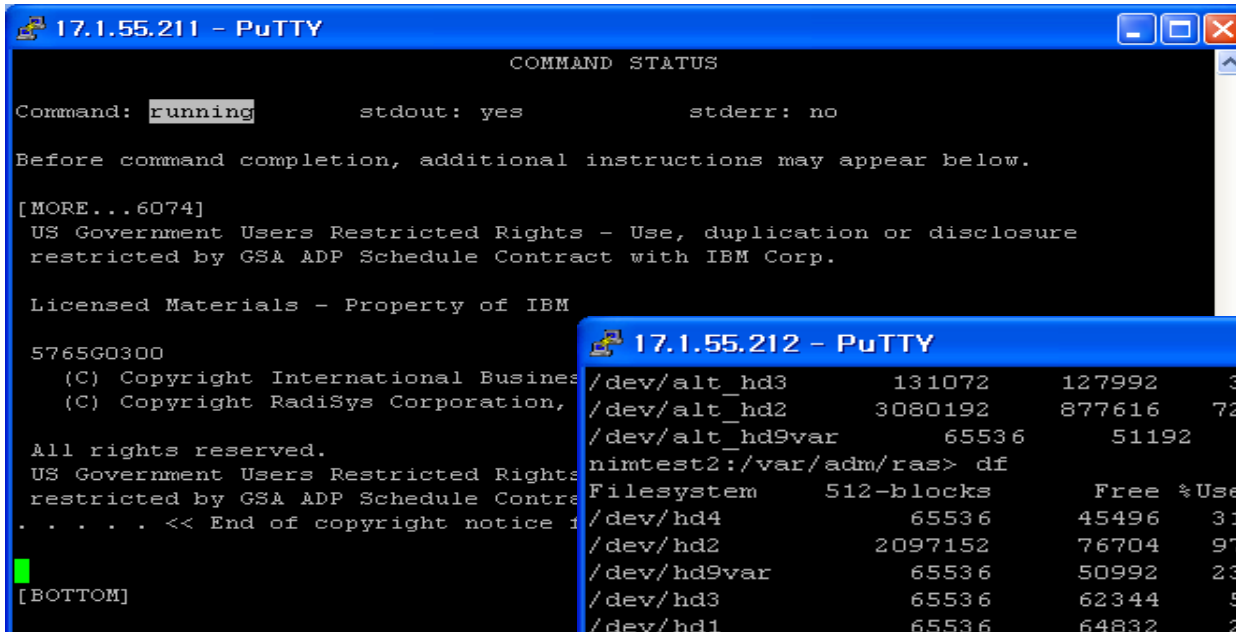
[ MORE...8 ]

F1=Help      F2=Refresh      F3=Cancel      F4=List
F5=Reset     F6=Command      F7=Edit        F8=Image
F9=Shell     F10=Exit        Enter=Do
  
```

Alt_disk를 이용한 OS migration

테스트 시나리오 2

■ alt_disk를 이용한 O/S migration (계속 ...)



```

17.1.55.211 - PuTTY
COMMAND STATUS
Command: running      stdout: yes      stderr: no
Before command completion, additional instructions may appear below.
[MORE...6074]
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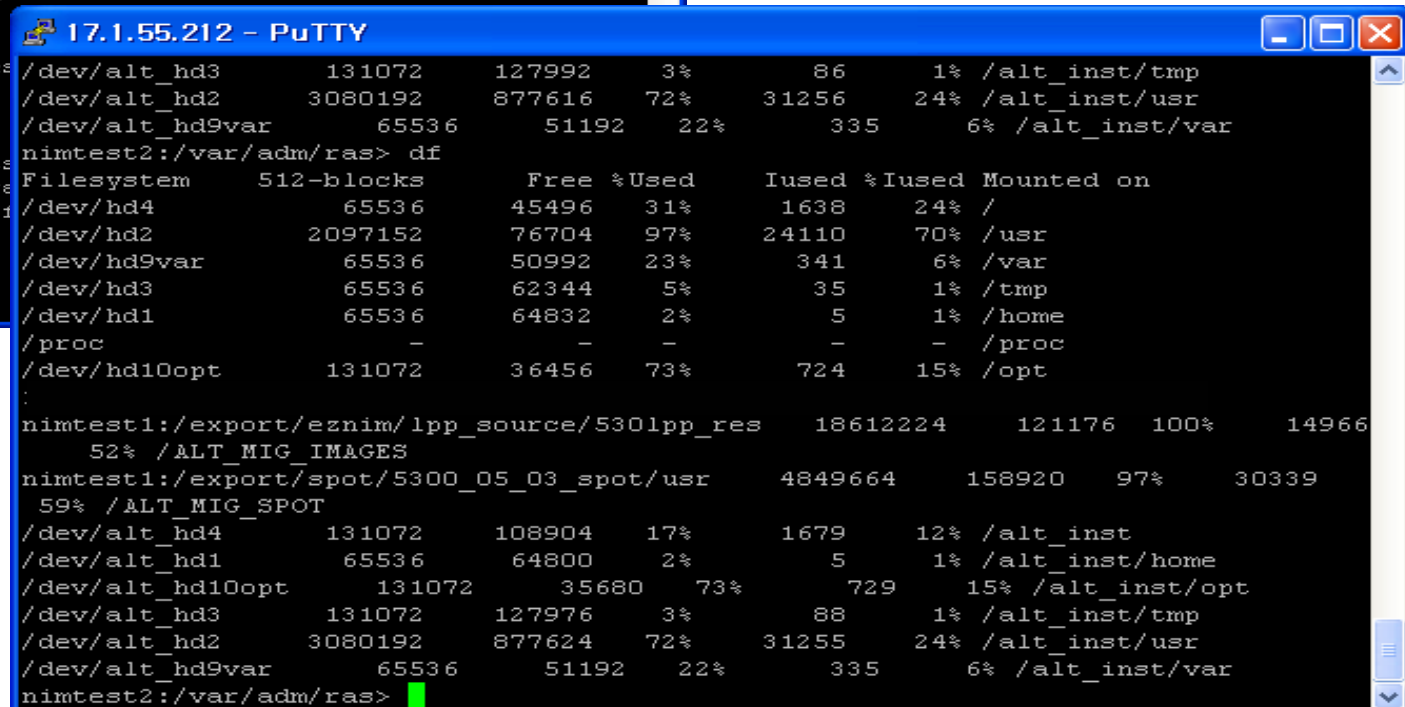
5765G0300
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[BOTTOM]
  
```

Master에서 Client의 OS Migration 진행

Client의 on-line 상태에서 alt_disk migration 진행



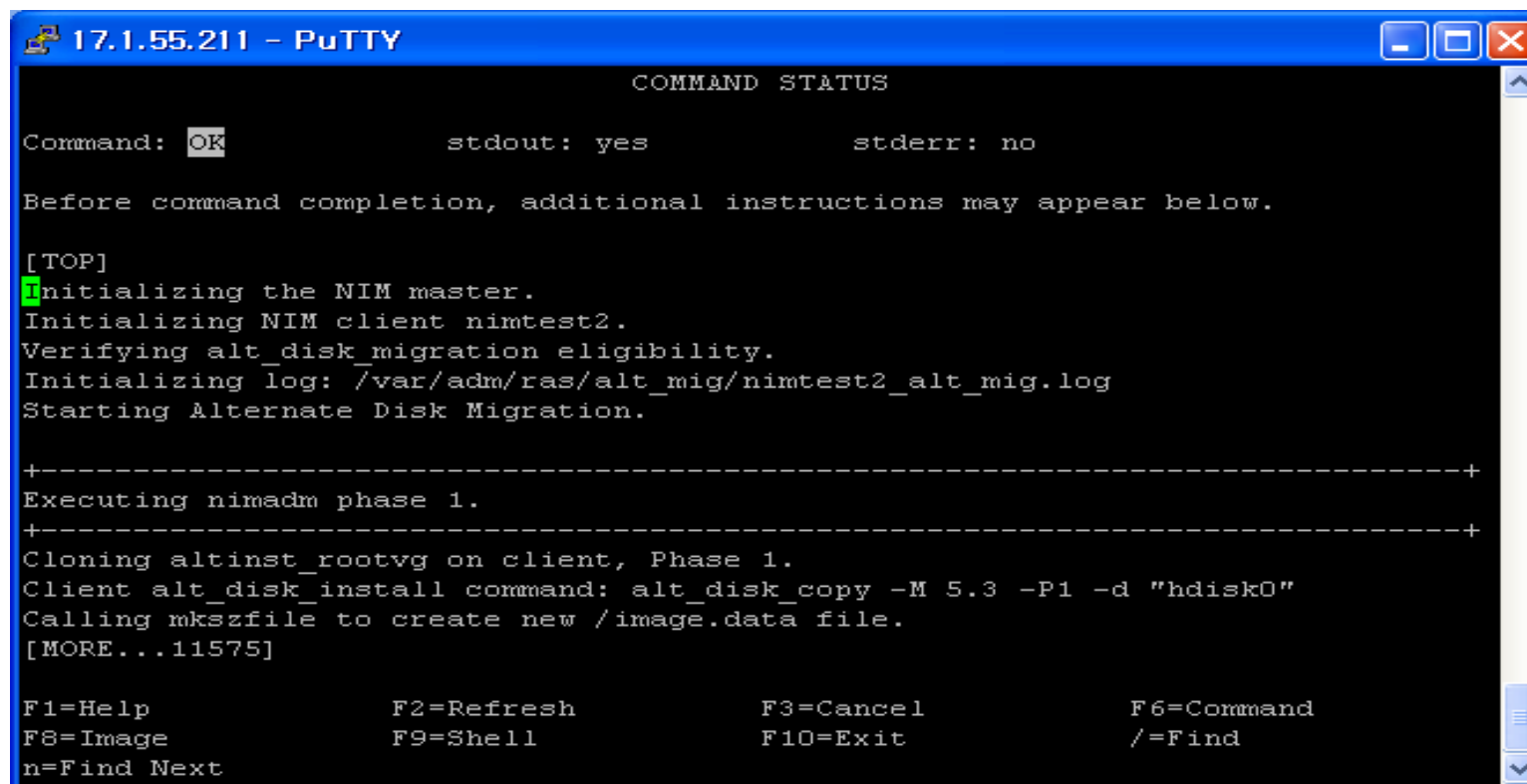
```

17.1.55.212 - PuTTY
/dev/alt_hd3      131072    127992    3%      86      1% /alt_inst/tmp
/dev/alt_hd2      3080192   877616   72%    31256   24% /alt_inst/usr
/dev/alt_hd9var    65536     51192   22%     335     6% /alt_inst/var
nimtest2:/var/adm/ras> df
Filesystem      512-blocks    Free %Used    Iused %Iused Mounted on
/dev/hd4         65536     45496   31%     1638   24% /
/dev/hd2        2097152     76704   97%    24110   70% /usr
/dev/hd9var      65536     50992   23%      341    6% /var
/dev/hd3         65536     62344    5%        35    1% /tmp
/dev/hd1         65536     64832    2%         5    1% /home
/proc            -          -    -          -    - /proc
/dev/hd10opt     131072     36456   73%      724   15% /opt
nimtest1:/export/eznim/lpp_source/530lpp_res 18612224 121176 100% 14966
52% /ALT_MIG_IMAGES
nimtest1:/export/spot/5300_05_03_spot/usr 4849664 158920 97% 30339
59% /ALT_MIG_SPOT
/dev/alt_hd4      131072    108904   17%     1679   12% /alt_inst
/dev/alt_hd1      65536     64800    2%         5    1% /alt_inst/home
/dev/alt_hd10opt  131072     35680   73%      729   15% /alt_inst/opt
/dev/alt_hd3      131072    127976    3%      88    1% /alt_inst/tmp
/dev/alt_hd2      3080192   877624   72%    31255   24% /alt_inst/usr
/dev/alt_hd9var    65536     51192   22%     335     6% /alt_inst/var
nimtest2:/var/adm/ras>
  
```

테스트 시나리오 2

■ alt_disk를 이용한 O/S migration (계속 ...)

Migration 성공 종료



```
17.1.55.211 - PuTTY

COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

[TOP]
Initializing the NIM master.
Initializing NIM client nimtest2.
Verifying alt_disk_migration eligibility.
Initializing log: /var/adm/ras/alt_mig/nimtest2_alt_mig.log
Starting Alternate Disk Migration.

+-----+
Executing nimadm phase 1.
+-----+
Cloning altinst_rootvg on client, Phase 1.
Client alt_disk_install command: alt_disk_copy -M 5.3 -P1 -d "hdisk0"
Calling mkszfile to create new /image.data file.
[MORE...11575]

F1=Help          F2=Refresh          F3=Cancel          F6=Command
F8=Image         F9=Shell            F10=Exit           /=Find
n=Find Next
```

테스트 시나리오 2

- alt_disk를 이용한 O/S migration (계속 ...)

Client의 bootlist를 alt_disk로 바꾸고 rebooting

17.1.55.212 - PuTTY

```

/dev/alt_hd9var      65536      51192    22%      335      6% /alt_inst/var
nimtest2:/var/adm/ras> df
Filesystem      512-blocks      Free %Used      Iused %Iused Mounted on
/dev/hd4         65536      45536    31%       1607    24% /
/dev/hd2        2097152      76704    97%      24110    70% /usr
/dev/hd9var      65536      50928    23%       335      6% /var
/dev/hd3         65536      62344     5%        34      1% /tmp
/dev/hd1         65536      64832     2%         5      1% /home
/proc            -          -         -          -      - /proc
/dev/hd10opt     131072      36456    73%       724     15% /opt

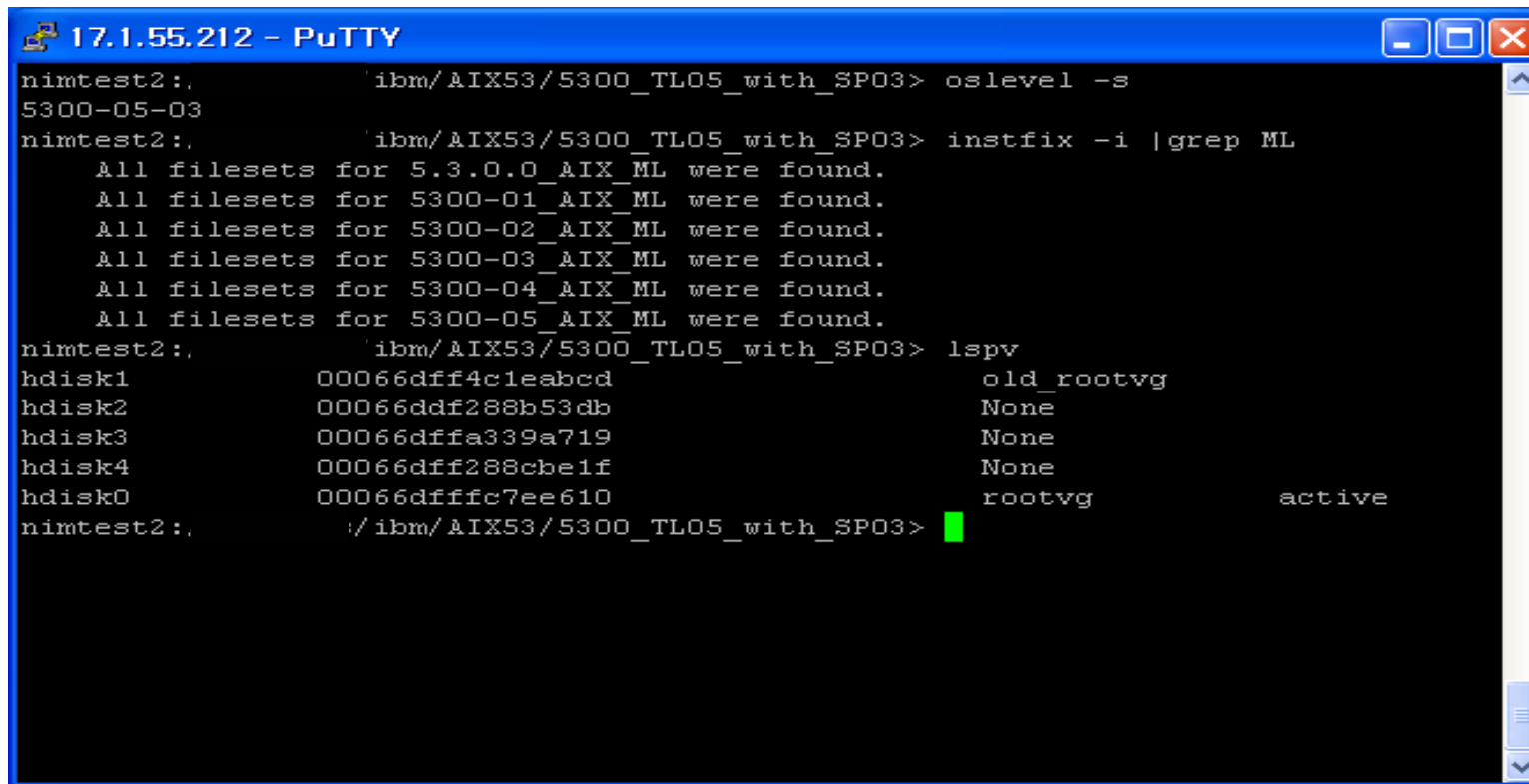
nimtest2:/var/adm/ras> lsvg
rootvg
altinst_rootvg
nimtest2:/var/adm/ras> lspv
hdisk1          00066dff4c1eabcd          rootvg          active
hdisk2          00066ddf288b53db          None
hdisk3          00066dffa339a719          None
hdisk4          00066dff288cbelf          None
hdisk0          00066dfffc7ee610          altinst_rootvg
nimtest2:/var/adm/ras> bootlist -m normal hdisk0
nimtest2:/var/adm/ras> bootlist -m normal -o
hdisk0 blv=hd5
nimtest2:/var/adm/ras>

```

테스트 시나리오 2

■ alt_disk를 이용한 O/S migration (계속 ...)

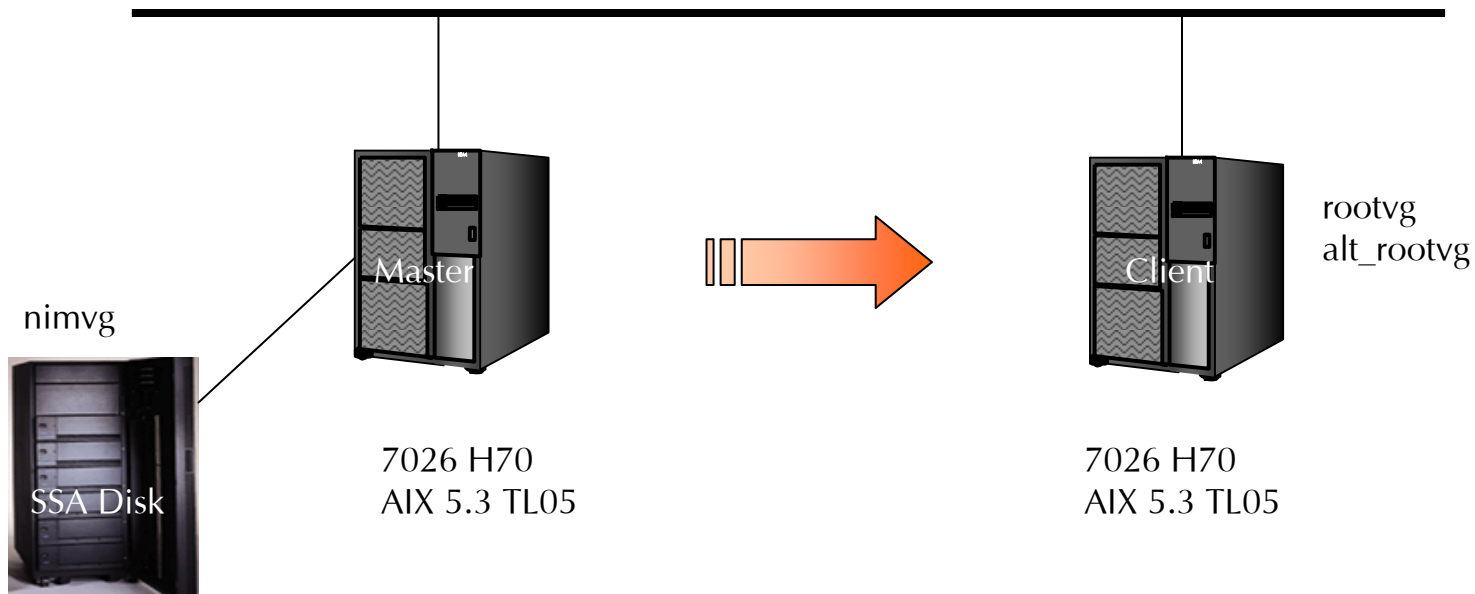
Rebooting후 client의 OS가 정상적으로 migration되었음을 확인



```
17.1.55.212 - PuTTY
nimtest2: /ibm/AIX53/5300_TLO5_with_SP03> oslevel -s
5300-05-03
nimtest2: /ibm/AIX53/5300_TLO5_with_SP03> instfix -i |grep ML
All filesets for 5.3.0.0_AIX_ML were found.
All filesets for 5300-01_AIX_ML were found.
All filesets for 5300-02_AIX_ML were found.
All filesets for 5300-03_AIX_ML were found.
All filesets for 5300-04_AIX_ML were found.
All filesets for 5300-05_AIX_ML were found.
nimtest2: /ibm/AIX53/5300_TLO5_with_SP03> lspv
hdisk1      00066dff4c1eabcd      old_rootvg
hdisk2      00066ddf288b53db      None
hdisk3      00066dffa339a719      None
hdisk4      00066dff288cbe1f      None
hdisk0      00066dfffc7ee610      rootvg          active
nimtest2: /ibm/AIX53/5300_TLO5_with_SP03>
```

테스트 시나리오 3

- 시스템 백업 이미지(mksysb) : resotre
 - aIX 5.3 TL05 → AIX 5.2 ML09
 - Client가 가지고 있던 기존의 system backup (mksysb)로 restore
 - 구성도



테스트 시나리오 3

■ 시스템 백업 이미지(mksysb) : resotre (계속 ...)

```

17.1.55.211 - PuTTY
Install and Update Software

Move cursor to desired item and press Enter.

Install the Base Operating System on Standalone Clients
Install Software
Update Installed Software to Latest Level (Update All)
Install Software Bundle
Update Software by Fix (APAR)
Install and Update from ALL Available Software
Install Linux on a Standalone Client or Machine Group

Select the installation TYPE

Move cursor to desired item and press Enter.

rte - Install from installation images
mksysb - Install from a mksysb
spot - Install a SPOT copy

F1=Help      F2=Refresh
F8=Image     F10=Exit
F9=/=Find    n=Find Next
  
```

복구할 client 및 mksysb, boot image 지정

```

17.1.55.211 - PuTTY
Install the Base Operating System on Standalone Clients

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[ TOP ]
* Installation Target
* Installation Type
* SPOT
  LPP_SOURCE
  MKSYSB

BOSINST_DATA to use during installation
IMAGE_DATA to use during installation
RESOLV_CONF to use for network configuration
Customization SCRIPT to run after installation
Customization FB Script to run at first reboot
ACCEPT new license agreements?
Remain NIM client after install?
[ MORE...36 ]

[ Entry Fields ]
nimtest2
mksysb
5200 09spot
[ 5200 09lpp ] +
nimtest2_sysb

[ 5200 09bosinst ] +
[ ] +
[ ] +
[ ] +
[ ] +
[ yes ] +
[ yes ] +

F1=Help      F2=Refresh      F3=Cancel      F4=List
F5=Reset     F6=Command      F7=Edit        F8=Image
F9=Shell     F10=Exit        Enter=Do
  
```

master에서 nim을 이용한 mksysb OS 복구

테스트 시나리오 3

- 시스템 백업 이미지(mksysb) : resotre (계속 ...)

```

17.1.55.212 - PuTTY
*****
*****
*****

Broadcast message from root@nimtest2 (tty) at 02:20:40 ...

*****
*****
*****

NIM has initiated a bos installation operation
Automatic reboot and reinstallation will follow
*****
*****
*****

```

Master에서 client의 restore 상황을 monitor
- reboot 진행 중

```

17.1.55.211 - PuTTY
control          = master
nimtest1:/> lsnim -l nimtest2
nimtest2:
class            = machines
type             = standalone
connect          = shell
platform         = chrp
netboot_kernel   = mp
if1              = kebnimtest nimtest2 0060949D20D2
cable_type1      = N/A
state            = Base Operating System installation is being performed
prev_state       = BOS installation has been enabled
Mstate          = in the process of booting
info             = verifying_data_files
boot             = boot
bosinst_data     = 5200_09bosinst
lpp_source       = 5200_09lpp
mksysb           = nimtest2_sysb
nim_script       = nim_script
spot             = 5200_09spot
cpuid            = 00066DFF4C00
control          = master
Cstate_result    = success
nimtest1:/>

```

Master에서 Restore명령 실시 직후 client는 rebooting

됨

테스트 시나리오 3

■ 시스템 백업 이미지(mksysb) : resotre (계속 ...)

```

17.1.55.211 - PuTTY
nimtest1:/export/eznim/mksysb> lsnim -l nimtest2
nimtest2:
class           = machines
type            = standalone
connect         = shell
platform        = chrp
netboot_kernel  = mp
if1             = kebnimtest nimtest2 0060949D20D2
cable_type1     = N/A
Cstate          = Base Operating System installation is being performed
prev_state      = BOS installation has been enabled
Mstate          = in the process of booting
info            = BOS install 19% complete : 17% of mksysb data restored.
boot            = boot
bosinst_data    = 5200_09bosinst
mksysb          = nimtest2_sysb
nim_script      = nim_script
spot            = 5200_09spot
cpuid           = 00066DFF4C00
control         = master
Cstate_result   = success
nimtest1:/export/eznim/mksysb>

```

client에서 mksysb로 복원된
rootvg를 확인

```

17.1.55.212 - PuTTY
nimtest2:/> lspv
hdisk1          00066dff4c1eabcd      altinst_rootvg
hdisk2          00066ddf288b53db      None
hdisk3          00066dffa339a719      None
hdisk4          00066dff288cbe1f      None
hdisk0          00066dffc7ee610      rootvg          active
nimtest2:/> oslevel -r
S200-09
nimtest2:/>

```

Master에서 client의 restore 상황을 monitor
– restore진행 중

테스트 시나리오 4

- 필요한 LPP_SOURCE 만들기
 - 이미 존재하는 LPP_SOURCE로 새로운 LPP_SOURCE 만들기
 - 새로운 LPP_SOURCE에 필요 없는 fileset 제거
 - 새로운 LPP_SOURCE에 필요한 fileset 추가

테스트 시나리오 4

- 존재하는 lpp_source를 이용하여 새로운 lpp_source 생성
 - Configure the NIM Environment → advanced Configuration → Create Basic Installation Resources → Create a New LPP_SOURCE Only → Select a SERVER for the resources

```
59.13.106.72 - PuTTY

Create an LPP_SOURCE

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

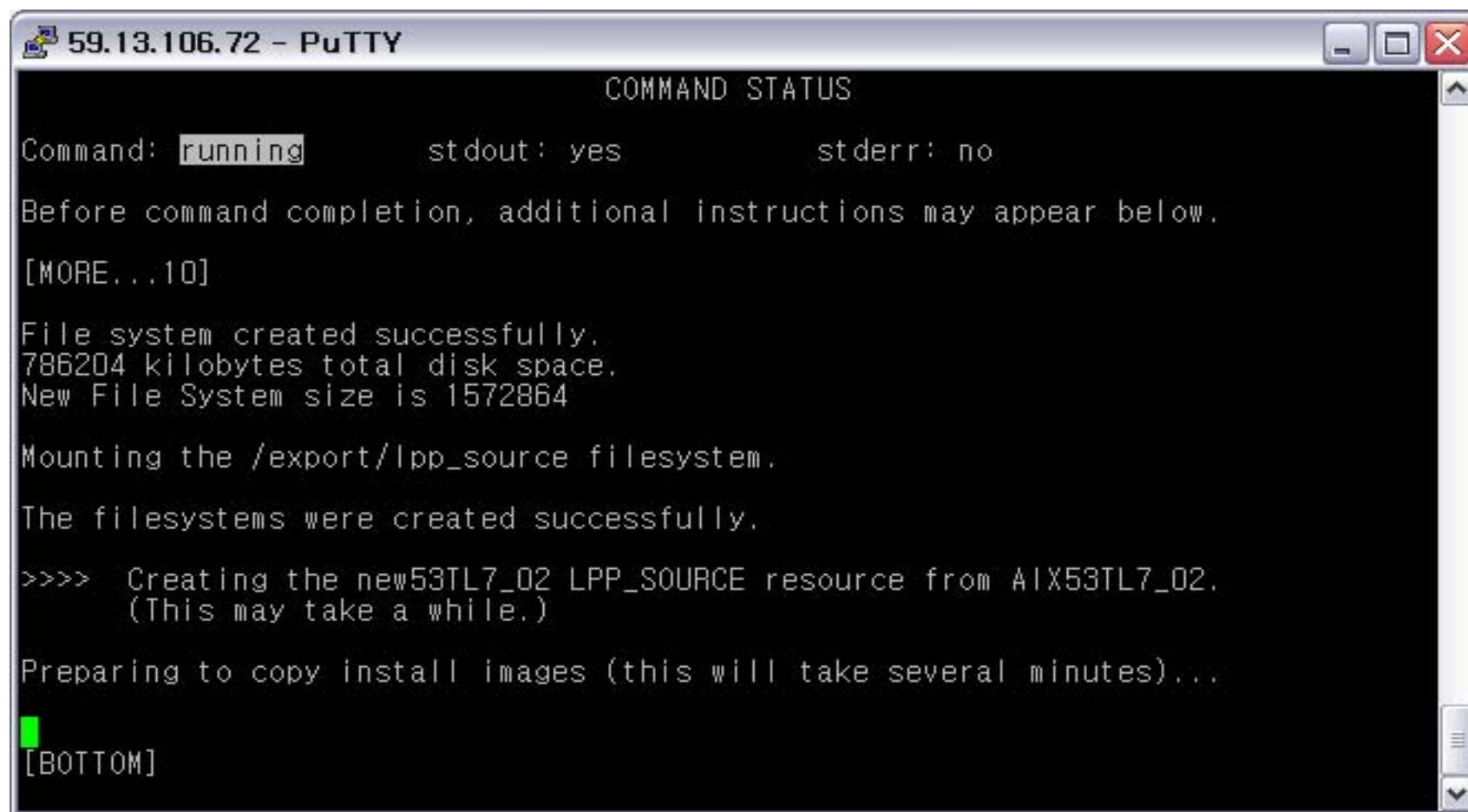
                                [Entry Fields]
* Resource SERVER                master
  Input device for installation images [AIX53TL7_02] +
  (specify the device on the resource server)
* LPP_SOURCE Name                [new53TL7_02]
* LPP_SOURCE Directory           [/export/lpp_source] +
  Architecture of Resource        [] +
  Show Progress                   [yes] +
  Create new filesystem for LPP_SOURCE? [yes] +
  Filesystem SIZE (MB)            [650] #
  VOLUME GROUP for new filesystem    [rootvg] +

  Remove all newly added NIM definitions [no] +
  and filesystems if any part of this
  operation fails?

F1=Help      F2=Refresh    F3=Cancel    F4=List
F5=Reset     F6=Command    F7=Edit     F8=Image
F9=Shell     F10=Exit      Enter=Do
```

테스트 시나리오 4

- 존재하는 lpp_source를 이용하여 새로운 lpp_source 생성



```
59.13.106.72 - PuTTY

COMMAND STATUS

Command: running      stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

[MORE...10]

File system created successfully.
786204 kilobytes total disk space.
New File System size is 1572864

Mounting the /export/lpp_source filesystem.

The filesystems were created successfully.

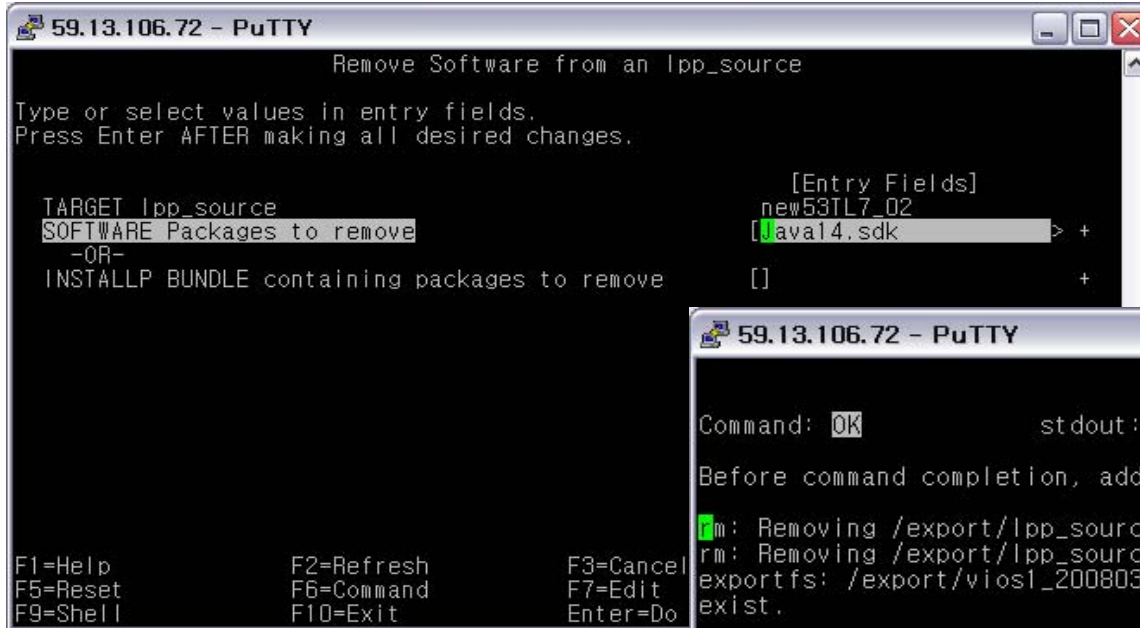
>>>> Creating the new53TL7_02 LPP_SOURCE resource from AIX53TL7_02.
      (This may take a while.)

Preparing to copy install images (this will take several minutes)...

[BOTTOM]
```

테스트 시나리오 4

- 새로운 LPP_SOURCE에서 필요없는 fileset 제거
- Perform NIM Software Installation and Maintenance Tasks → Software Maintenance and Utilities
→ Remove Software from an lpp_source → TARGET에서 lpp_source 선택



```

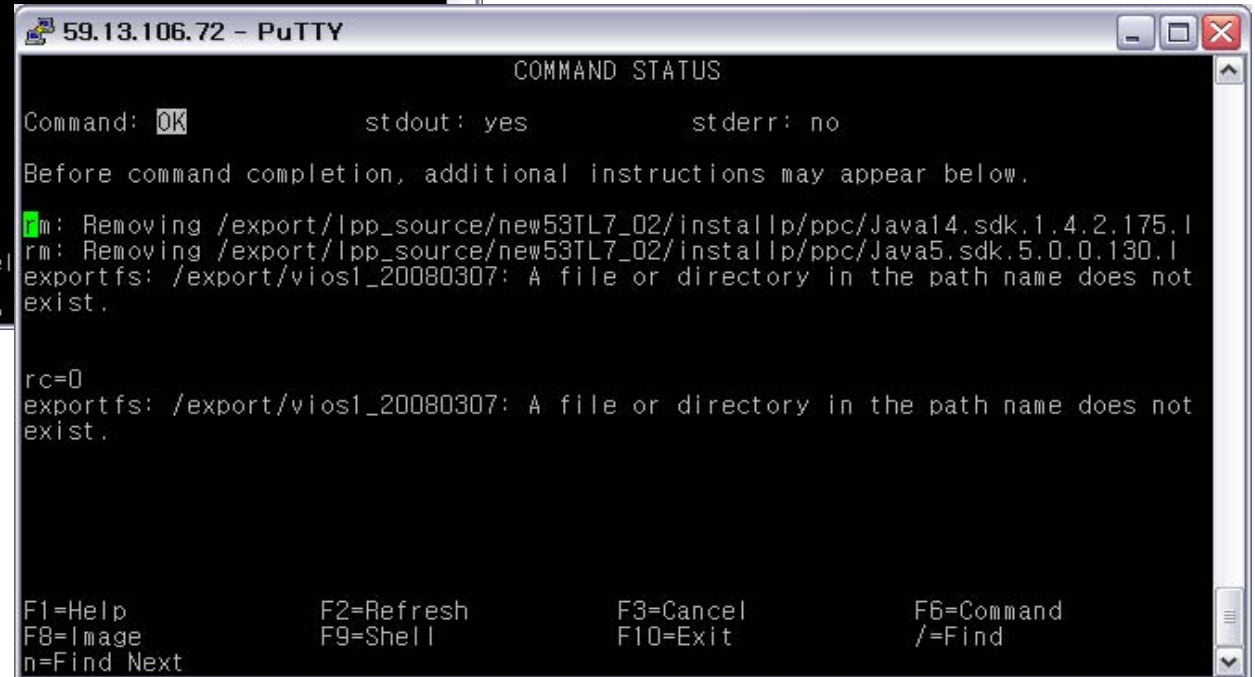
59.13.106.72 - PuTTY
Remove Software from an lpp_source

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

[Entry Fields]
new53TL7_02
Java14.sdk > +
[] +

TARGET lpp_source
SOFTWARE Packages to remove
-OR-
INSTALLP BUNDLE containing packages to remove

F1=Help      F2=Refresh    F3=Cancel
F5=Reset     F6=Command    F7=Edit
F9=Shell     F10=Exit      Enter=Do
  
```



```

59.13.106.72 - PuTTY
COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

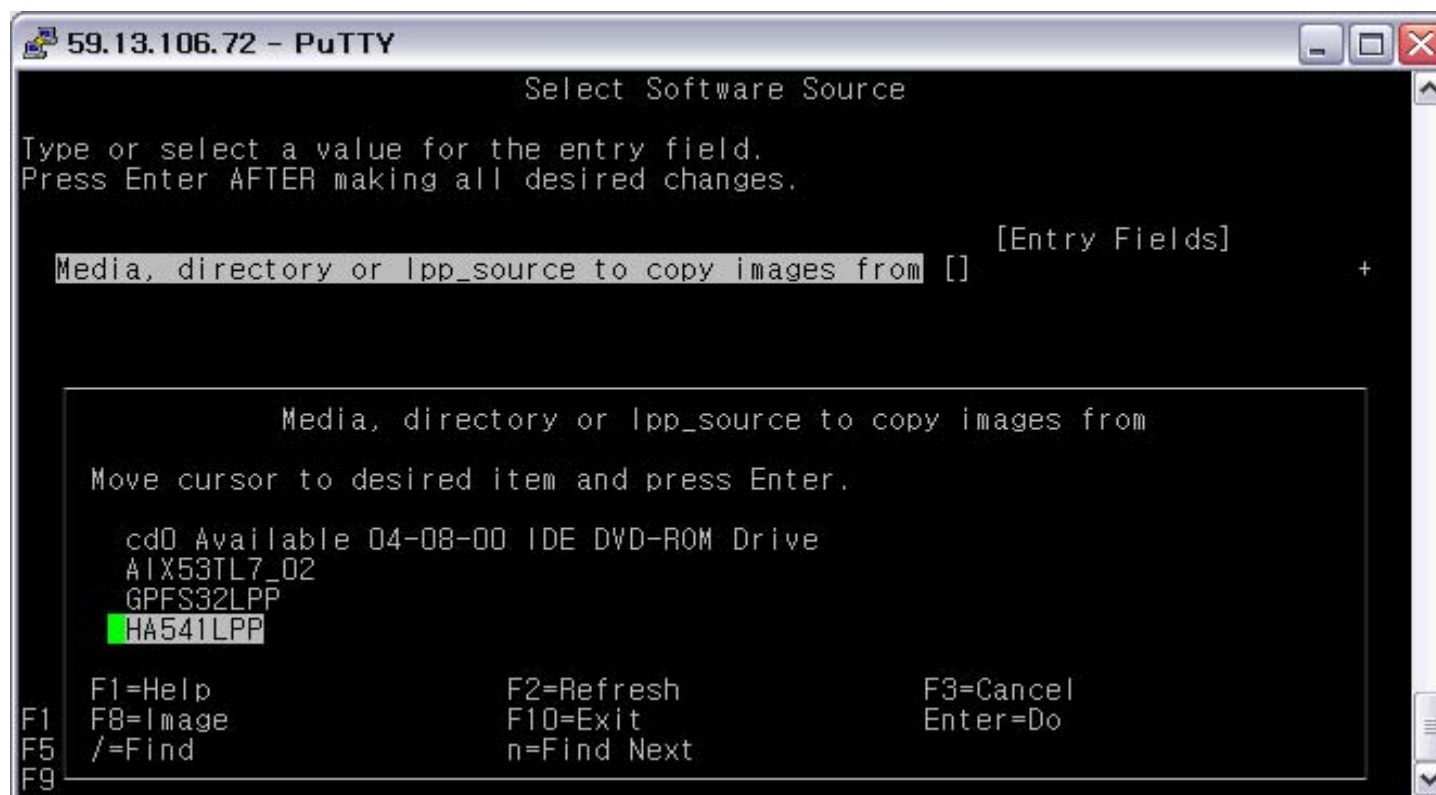
rm: Removing /export/lpp_source/new53TL7_02/installp/ppc/Java14.sdk.1.4.2.175.l
rm: Removing /export/lpp_source/new53TL7_02/installp/ppc/Java5.sdk.5.0.0.130.l
exportfs: /export/vios1_20080307: A file or directory in the path name does not
exist.

rc=0
exportfs: /export/vios1_20080307: A file or directory in the path name does not
exist.

F1=Help      F2=Refresh    F3=Cancel    F6=Command
F8=Image     F9=Shell      F10=Exit     /=Find
n=Find Next
  
```

테스트 시나리오 4

- 새로운 LPP_SOURCE에서 필요한 fileset 추가
- Perform NIM Software Installation and Maintenance Tasks → Software Maintenance and Utilities
→ Add Software from an lpp_source →



테스트 시나리오 4

- 새로운 LPP_SOURCE에서 필요한 fileset 추가 (계속 ...)
- Perform NIM Software Installation and Maintenance Tasks → Software Maintenance and Utilities
→ Add Software from an lpp_source →

```

59.13.106.72 - PuTTY
Add Software to an lpp_source

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

TARGET lpp_source
SOURCE of Software to Add
SOFTWARE Packages to Add
-OR-
INSTALLP BUNDLE containing packages to add
gencopy Flags
  DIRECTORY for temporary storage during copy
  EXTEND filesystems if space needed?
Process multiple volumes?

F1=Help      F2=Refresh   F3=Cancel
F5=Reset     F6=Command   F7=Edit
F9=Shell     F10=Exit     Enter=Do
  
```

```

59.13.106.72 - PuTTY
COMMAND STATUS

Command: running      stdout: yes      stderr: no

Before command completion, additional instructions may appear below.

/export/lpp_source/new53TL7_02/installp/ppc/cluster.msg.en_US.assist.5.4.1.0.U
/export/lpp_source/new53TL7_02/installp/ppc/cluster.msg.en_US.assist.5.4.1.0.I
  
```

Q&A



감사합니다.